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THE MEDIATING EFFECT OF INFORMAL ACCOUNTABILITY FOR OTHERS

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ABSTRACT

This study is a systematic inquiry into the relationship between personal and organizational antecedents (i.e., self-regulation and embeddedness), informal accountability for others (IAFO), and organizational citizenship behaviors (OCB). The novel contribution that this paper attempts to make to the literature is showing that the relationships between embeddedness, self-regulation and OCBs are at least partially mediated by IAFO. We investigated these hypotheses using data collected across two different samples: an organizational sample of 105 employees from a physical fitness facility and the other an amalgam sample of 187 working adults. Results indicated that IAFO fully mediated the relationship between self-regulation and OCB and partially mediated the relationship between embeddedness and OCB in the organizational sample. Data from the amalgam sample suggested that the relationship between self-regulation and OCB also was fully mediated IAFO, and the embeddedness - OCB relationship partially mediated. Strengths, limitations, directions for future research, and practical implications are discussed.

KEYWORDS: embeddedness, informal accountability for others, organizational citizenship behavior

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INTRODUCTION

Hard on the heels of several high-profile US corporate scandals (e.g., Enron, WorldCom, Arthur Anderson, and more recently Fannie Mae) comes a growing concern in both academic literature and the popular press concerning a perceived lack of accountability. Accountability is a fundamental aspect of both personal and organizational life (Tetlock, 1985, 1992). A lack of accountability may usurp a firm's legitimate governance system of checks and balances, consequently affecting the performance of the organization adversely (Yarnold, Muesur, & Lyons, 1988; Enzele & Anderson, 1993). So fundamental is accountability that Lerner and Tetlock (1999) contended that social interactions would be impossible without it. However, accountability need not always be a formal system or reporting, and often individuals will feel pulled in several different directions at once by various constituencies (Cummings & Anton, 1990). This suggests that others are important in determining how accountable one feels.

We contend that informal accountability for others exists in virtually all work settings. Frink and Klimoski (1998, 2004) noted that external conditions help shape perceptions of accountability, but that ultimately it is the individual's choice whether it is accepted. It is our contention that individuals choose to engage in behaviors that demonstrate their accountability for others. In other words, it is not just there, it is enacted and embraced as a tool for managing the environment and reducing uncertainty. This is prediction consistent with control theory predictions that individuals will engage in such behaviors because they seek to minimize the discrepancy between their present condition and a desired goal state (Carver & Scheier, 1982).

To date, little research has dealt with the notion that individuals might feel accountable for others at work. Fundamentally, this paper is intended to help further establish the construct of informal accountability for

others (IAFO) - the public demonstration that one is willing to answer for the attitudes and behaviors of individuals in an organization regardless of formal position within the firm, rank, or mandate by the organization. We also intend to close a gap in accountability theory. It is important for the field to ascertain if individuals actually feel accountable for others, and if so, what motivates individuals to seek IAFO. Furthermore, once established, scholars and practitioners alike will benefit by the demonstration of its effects on organizations.

One organizational outcome that continues to attract attention from researchers, which might prove illuminating in conjunction with IAFO, is organizational citizenship behavior (OCB). These are extra-role behaviors carried out by individuals to promote organizational well-being, despite the fact that there is no formal mandate to do so (Brief & Motowidlo, 1986). Several authors have posited that, employees' citizenship behaviors can be distinguished based on the target of the behaviors (Lee & Allen, 2002; Organ & Konovsky, 1989). Those targeted at the organization focus on, and benefit, the firm directly (Williams & Anderson, 1991). This dimension includes creative deployment of personal energies, organizational loyalty, compliance, and job dedication (e.g., come to work early/stay late).

The other dimension of OCB is aimed at individuals. These actions immediately benefit specific others (e.g., peers, supervisors, subordinates) and indirectly benefit the organization. Individual-targeted behaviors include other helping behaviors (e.g., mentoring), positive cooperative behaviors (e.g., altruism and courtesy), and other types of interpersonal facilitation (Podsakoff, McKenzie, Paine, & Bachrach, 2000). The current research attempts to determine if, by seeking to answer for others, individuals positively affect the efforts of others thus promoting acts of good organizational citizenship. Also important to the current research, and the field in general, is further developing and evaluating antecedents of IAFO that are conceptually linked to OCB. In this respect, embeddedness (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001; Lee, Mitchell, Sablynski, Burton, & Holtom, 2004) and self-regulation (Vohs and Baumeister, 2004) might prove fruitful.

An important element of self-regulation is attentional control, which represents the ability to voluntarily attend to relevant stimuli, while ignoring extraneous environmental cues (Baumeister & Heatherton, 1996). Research indicated that those with high self-regulatory capabilities perform better on learning tasks (Grolnick & Ryan, 1987), and are more likely to experience feelings of psychological well-being and positive affect (Burton, Lydon, D'Allesandro, & Koestner, 2006; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Research has established that positive affect promotes pro-social behaviors; particularly those related to the discretionary use of time to help others complete tasks (Organ, 1988; McKenzie, Podsakoff, & Fetter, 1993).

We contend that high levels of self-regulation will positively impact IAFO and is facilitated by reciprocal social obligations (Gouldner, 1960). In other words, when good performers (e.g., high self-regulator) speak up for struggling coworkers, they do so due to positive emotional states based on a high degree of certainty in their own abilities based on prior successes. Poorer performers feel obligated to take advice from these individuals when they have spoken on their behalf and will attempt to model their attitudes and behaviors after the better performers in hopes of higher achievement. Consistent with the research of Organ (1988) and McKenzie, Podsakoff, and Fetter, (1993), we anticipate that superior performers will then involve themselves with those for whom they are accountable to ensure their necessary skill development, and avoid possible damage to their reputations should their new-found protégés under-perform.

Our other major contention is that embeddedness promotes IAFO, which in turn predicts OCB. Embeddedness theory contended that transactions between individuals create future expectations of trust and reciprocity (Uzzi & Gillespie, 2002). These expectations arise because the embeddedness of interpersonal interactions are learned and mutually understood through socialization. Moreover, if initial

extensions of trust are accepted and reciprocated, embeddedness becomes self-reinforcing (Barney & Hansen, 1994; Uzzi, 1997). Embeddedness provides the essential priming mechanism for initial offers of trust and mutual reliance that, if accepted and returned, are solidified through reciprocal investments. We contend that embedded individuals are likely to seek IAFO due to the above described sense of trust and faith that speaking for others benefits both themselves (e.g., enhanced reputation as a team player) and their organizations.

LITERATURE REVIEW

Accountability

The development of theory in accountability research has been dominated by a relatively few number of major contributors. Among these competing conceptualizations are those rooted in the phenomenology of accountability (e.g., Tetlock, 1985, 1992), those that evaluate it vis-à-vis its relationship to responsibility (e.g., Schlenker, 1986), and deviation from social expectations (Cummings & Anton, 1990).

The phenomenological view of accountability, based on Tetlock's (1985, 1992) social contingency model, includes several empirically distinguishable, well-known sub-components common to the social psychology literature. These include (a) the mere presence of others (individuals expect that another will observe their performance (Zajonc, 1965; Zajonc & Sales 1966); (b) identifiability (individuals believe that what they say or do will be linked to them personally) (Price, 1987; Zimbardo, 1970); (c) evaluation (participants expect that their performance will be assessed by another according to some normative ground rules and with some implied consequences) (Geen, 1991); and (d) reason-giving (individuals expect that they must give reasons for their attitudes or behaviors) (Simonson & Nowlis, 2000).

Despite the prevalence of the phenomenological view, an interesting disconnect exists in empirical investigations of accountability. The social contingency model (e.g., Tetlock, 1992) proposes that accountability is largely subjective, and internal. However, the preponderance of empirical accountability studies has treated accountability as an objective, external condition (Frink & Klimoski, 1998, 2004; Lerner & Tetlock, 1999). This limitation has caused researchers to potentially miss many facets of informal accountability for others, leaving the construct largely underdeveloped. For example, no systematic examination has been given to determine which internal factors contribute to making one feel accountable for those who are not formal subordinates.

A major feature of the phenomenological view is its attention to individuals' behaviors depending on the time at which they realize they are accountable. It is possible individuals know *a-priori* that they are accountable for a given course of action. On the other hand, they may not know the audience to whom they answer until they have already made pertinent decisions. The phenomenological view predicts different behaviors based on this distinction. Generally, studies have shown that when individuals believe they have to justify their views, they express opinions consistent with those perceived to be held by the audience (e.g., Brief, Dukerich, & Doran, 1991). These findings help substantiate Tetlock's (1985, 1992) contention that the acceptability heuristic (often resulting in the rendering of lower quality, less cogent and complex decisions), is likely to occur as individuals seek to conform as opposed to come up with the "best" solution.

If individuals do not know the audience's opinions and thus cannot automatically conform, Tetlock (1985, 1992) contended they would preemptively self-criticize. In terms of proactive behaviors, pre-emptive self-criticism is likely to yield the most comprehensive and integrative decision making strategies. In effect, individuals consider as many "angles" as possible before determining the most appropriate course of action.

However, ignorance to the opinions of the reviewing audience is not certain to produce integrative strategic thinking. For example, both cognitive dissonance (Festinger, 1957) and impression management theories (Schlenker, 1980); Tetlock (1985, 1992) predict that individuals will engage in retrospective rationality (i.e., defensive bolstering) when their behaviors are at odds with the opinions and standards of the reviewing audience. Staw and Ross (1980) validated this assumption by showing that post-decisional accountability encouraged individuals to generate reasons as to why they were not wrong to act as they did.

The Pyramid Model of Accountability, in Schlenker's terms, refers to being answerable to audiences for performing to certain prescribed standards. This entails meeting obligations, duties, and expectations (Schlenker, 1986; Schlenker & Weigold, 1989; Schlenker, Weigold, & Doherty, 1991). The dimensions of these models are more formal and objective than phenomenological conceptualizations of accountability.

The "evaluative reckonings" described by Schlenker and colleagues (e.g., Schlenker, 1986, Schlenker & Weigold, 1989; Schlenker et al., 1991) are value-laden judgments that require an evaluator to possess information about three key elements in order to assign culpability. The elements necessary to make these judgments are: (1) the prescriptions guiding the actor's conduct on the occasion, (2) the event that occurred is relevant to those prescriptions, and (3) a set of identity images relevant to the event and prescriptions that describe the actor's roles, qualities, convictions, and aspirations.

The three elements and the linkages among them create a triangle when visualized, thus the classification. Schlenker et al (1991) contended that the combined strength of the three linkages determines how responsible an individual is judged to be. That is, individuals are held responsible to the extent that (a) a clear set of prescriptions is applicable to the event (prescription–event link), (b) the prescriptions are perceived to bind an individual by virtue of his or her identity (prescription–identity link), and (c) the individual is associated with the event, especially if that person is thought to have had personal control over the event (identity–event link). When an evaluating audience is added to the model in the form of "looking down" and appraising (i.e., either lauding or condemning) the configuration of the elements and linkages, the image becomes a pyramid (Schlenker, 1986).

Our Construct Domain of Informal Accountability for Others**,** conceptualization of informal accountability for others borrows from Morrison and Phelps's (1999) discussion of responsibility for others. They noted that individuals believe they are personally obligated to bring about constructive change, which affects (benefits), either directly or indirectly, both themselves and others. Another portion comes from Lerner and Tetlock (1992), who called accountability the implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, or actions to others. Still another comes from Ferris, Mitchell, Canavan, Frink, and Hopper (1995), who considered accountability to be a function of how much a person is observed and evaluated by powerful others who have reward or sanctioning power, and the extent to which valued rewards (or feared sanctions) follow these evaluations. Hall, Frink, Ferris, Hochwarter, Kacmar, and Bowen (2003) defined accountability as "…an implicit or explicit expectation that one's decisions or actions will be subject to evaluation by some salient audience(s) with the belief that there exists the potential for one to receive either rewards or sanctions based on this expected evaluation," This framework drove the definition of IAFO offered earlier in this paper.

Embeddedness

Job embeddedness is conceptualized as a broad constellation of influences on employee retention, performance, and organizational citizenship behaviors (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001; Lee, Mitchell, Sablynski, Burton, & Holtom, 2004). The most important facets of job embeddedness are (1) the degree to which individuals are linked to other people and activities, (2) the extent to which their

jobs and communities fit with other aspects in their "life spaces", and, (3) the ease of which these links could be broken and what individuals would give up if they left (Mitchell et al., 2001; Lee et al., 2004). Lee et al. (2004) noted that the interrelatedness of these dimensions is important because many job factors affect individuals' desires to engage in their work, stay at their jobs or withdraw. This aspect of embeddedness theory represents an extension of March and Simon's (1958, p.72) claim that "[f] amilies often have attitudes about what jobs are appropriate for their members… the integration of individuals into the community has frequently been urged by organizations because it offers advantages for public relations and reduces voluntary mobility." The two aspects of embeddedness theory (Mitchell et al., 2001; Lee et al., 2004) that relate to informal accountability for others which will be discussed in this paper are "links" and "fit"

Links may be either formal or informal connections between a person, the institutions and/or other individuals (Mitchell et al., 2001; Lee et al., 2004). Accordingly, a number of links may connect an employee with his or her work, friends, groups, and the community in which he or she resides. The greater the number of links, the more the individual is bound to the job and the organization (Mitchell, et al., 2001; Lee et al., 2004).

The more tightly one is linked to others in the organization, the more likely he/she feels informally accountable for them due to recurrent interactions and fewer options or desires to break these ties. Note also that breaking these links may be differentially punitive. If individuals are visibly linked to others who are important or influential in an organization, it holds that they will try to keep those links strong.

Increasing numbers of links exacerbate the potential that individuals will seek conditions of informally accountable for others. Tightly linked individuals will be aware of the informal accountability demands being placed upon them with respect to others, and will wish to keep the web in which they function strong by not breaking any of its linkages. They will do so due to the understanding that by behaving in a manner which demonstrates IAFO, they can help ensure other members perform adequately. The ability to promote good performance in others augments organizational performance and may also strengthen the links themselves.

Furthermore, these links are viewed as potential resources (e.g., Lee et al., 2004), whereby the accumulation and strengthening of these links might be utilized at a later time. Similarly, tightly linked individuals might also be motivated to become informally accountable for others due to their understanding that networks, like nets, fail when strands break. In other words, to ensure success, individuals will make certain that others with whom they are linked are proficient in order to capitalize on these relationships.

Fit is defined as employees' perceived compatibility or comfort with an organization and with their environment (Mitchell et al., 2001; Lee et al., 2004). According to embeddedness theory, one's personal values, career goals, and plans for the future should fit with the values and culture of the organization as a whole, and with elements of his/her job description (e.g., knowledge, skills, and abilities) (Mitchell et al., 2001; Lee et al., 2004). Research has shown that the tighter the fit, the greater the likelihood an individual will feel professionally and personally tied to an organization (Mitchell et al., 2001; Lee et al., 2004).

A tight fit indicates a shared sense of similarity and value congruence between individuals and other members and/or the organization. Further, Snyder and Ickes (1985) contended that individuals choose to gain entrance to organizations and situations that affirm their self-concepts, attitudes, values and affinities. As such, it is likely that high levels of interpersonal affect exist between individuals who fit. Individuals who fit tightly probably interact more frequently with others, both formally and socially, in the organization. It is not unrealistic to expect that under these conditions, individuals seek informal accountability for others because they might be friends with these people. They also might feel that a

failure to embrace IAFO jeopardizes the fit they currently experience, especially if it violates established informal organizational norms.

Those who fit tightly with others will be motivated to seek informal accountability for others because they like and value them. Additionally, those who fit tightly demonstrate their willingness to accept part of the blame for those close to them if they fail in some aspect of work. Research has established that individuals who fit will foster consistent social environments, which in turn promotes behavioral consistency (Bowers, 1973; Ickes, Snyder, & Garcia, 1997). Thus, the strength of social alliances that tightly fitting individuals enjoy helps reduce uncertainty.

Self-Regulation

Actions that involve conscious, deliberate, and controlled responses by the self, are thought to be disproportionately important to one's health, success, and happiness (Baumeister, Brataslavsky, Muraven, & Tice, 1998). Much of what researchers (e.g., Baumeister et al., 1993; Carver & Scheier, 1981, 1982; Carver, 2004) consider within the domain of self-regulation is rooted in self-awareness research. Vohs and Baumeister (2004) contended that self-regulation constitutes a conscious effort to align behaviors with established and preferred standards of conduct. Fundamentally, this involves directing behaviors toward the achievement of goals set forth in advance (Baumeister et al., 1998). Furthermore, one reason individuals focus their attention is to reduce current and future uncertainty.

Unfortunately, attention is a resource and these are generally expended more rapidly than they are replenished (Baumeister et al., 1998). Accountability conditions (i.e. informal and for others) do not always allow individuals to stop and restore resources, but instead, keep them continuously scrutinized. Consequently, resource-accumulating activities (e.g., securing control over decision making) that are self-generated help ensure that ego-depletion does not bring the individual below a threshold necessary for adequate functioning.

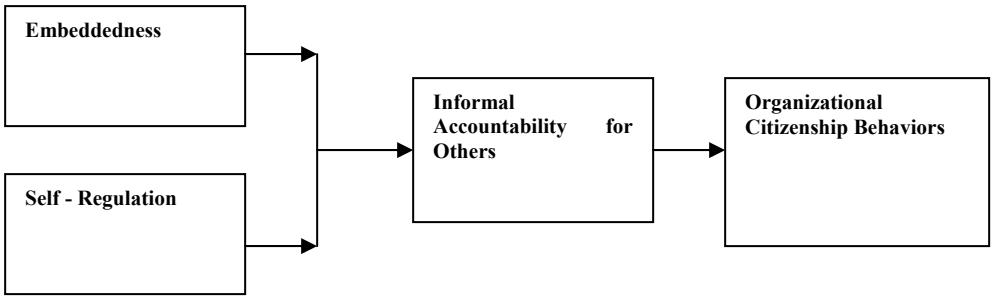
We contend that individuals high in self-regulation are able to effectively prioritize how they accomplish tasks thus becoming more efficient than others. Because they are more efficient, they can make time, and potentially pass along important information to others. Although accountability has been shown to promote stress (e.g., Ferris, et al., 1995), individuals who seek informal accountability for others are not likely to feel strained or depleted because they are simultaneously engaged in resource accumulation that offsets the losses stress might promote. The compliance (Gouldner, 1960) and possible coalitions they build with those for whom they are informally accountable become additional resources. Further, employees who are members of strong coalitions are able to undermine some attempts at unwanted, uncertainty evoking changes, devised by leaders (Deluga, 1988).

Organizational Citizenship Behaviors

Organizational citizenship behaviors involve individuals taking the initiative not only to do "their duty" in terms of job performance but also to help their colleagues, and act as diligent stewards with respect to organizational resources (Lian, Ling, & Hsieh, 2007). When members behave in this fashion, the organization will not likely reward them financially, but will factor these behaviors into decisions related to pay and promotion at some future date (Lian et al., 2007). Several components of organizational citizenship behaviors involve behaviors that target others in the organization (Bateman & Organ, 1983) whereas others include altruism and generalized compliance (including compliance, loyalty and participation). The most comprehensive and widely accepted view of OCB is Organ's (1988), which incorporates collegiality, conscientiousness, respect for the law, sportsmanship, courtesy, and civic virtue (Cheng, Hsieh, & Chou, 2002). We contend that seeking informal accountability for others serves to both promote one's reputation and is courteous, conscientious, supportive of others, and civically virtuous.

Figure 1 provides a mediating model of IAFO on the embeddedness-link and self regulation-OCB Relationship.

Figure1: Mediating Model of IAFO on the Embeddedness-Links and Self Regulation-OCB Relationship



METHOD – AMALGAM SAMPLE

The Current Research

We conducted two studies to analyze the mediating effects of informal accountability for others on the embeddedness and self-regulation - organizational citizenship behavior relationships. Conducting multiple studies was desirable for a number of reasons (see Lykken, 1968). First, we were interested in ensuring that our findings were not particular to any particular work setting. Second, our contribution to theory would be amplified if significant effects emerged in multiple, yet unique, studies.

Participants and Procedures – Amalgam Sample

The amalgam sample consisted of self-reports from working adults around the world. Students involved in an extra credit assignment gave the employee survey only to individuals they knew to be employed full time in various organizations. A group of 75 students were allowed to distribute up to 5 surveys per person for extra credit. As such, we gave the students a total of 375 surveys. Ultimately, a sample of 185 usable employee surveys were returned to us constituting a response rate of 49%.

Respondent occupations included accountants, human resources administrators, sales professionals, marketing directors, and food service personnel. The average age of respondents was about 37 years and the average organizational tenure was 7 years. The sample included 98 females (55%).

Measures

Prior to using any measures, regardless of their prevalence in extant literature, we tested the dimensionality of the constructs using principal component analysis with an orthogonal (Varimax) rotation. Applying Kaiser's Rule (retaining factors with eigenvalues over one), we examined the amount of variance extracted in the construct by the first factor relative to others (Pallant, 2004; Kaiser, 1974). The expected factor structures emerged, thus we did not delete any items in any scales in the analyses.

The 11-item measure of embeddedness is an adaptation of Mitchell et al.'s (2001) scale. It focuses only on the fit and links dimensions of embeddedness (α = .79 and .69) respectively (Mitchell et al., 2001). In this scale, six items measure links and five items measure fit. Sample items for embeddedness include, "Many employees are dependent on me at work" and "I fit with this company's culture." A two-factor structure was supported for embeddedness (eigenvalues = 3.51 and 1.59 for links and fit respectively,

proportion of explained variance = .47). The scale employs a five-point response format (1 = *strongly disagree* to 5 = *strongly agree*).

We used a seven-item scale developed by Luszczynska, Diehl, Gutierrrez-Dona, Kuusinen, and Schwarzer (2004) (α = .79) to measure attention regulation. Example items include, "I can concentrate on one activity for a long time, if necessary." Analyses indicated that a single factor emerged (eigenvalue = 2.02, proportion of explained variance = .50). The scale employs a five-point response format (1 = *strongly disagree* to 5 = *strongly agree*).

In order to tap informal accountability for others construct, we amended Deluga's (1991) five-item scale. This scale was derived from Ivancevich and Matteson's (1980) "Responsibility for people" portion of their Stress Diagnostic Survey (α = .82). Sample items include, "I am accountable for making decisions that affect the well being of others although it is not part of my formal job duties". Analyses indicated a unidimensional factor structure for IAFO (eigenvalue = 3.93, proportion of explained variance = .62). The scale employs a five-point response format (1 = *strongly disagree* to 5 = *strongly agree*).

We measured citizenship behaviors using Podsakoff, MacKenzie, Moorman, and Fetter's (1990) six-item scale (α = .83). Sample items in this scale include, "I often help others when they have a heavy workload." Analysis produced the expected factor structure (eigenvalue = 1.75, proportion of explained variance = .43). The scale employs a five-point response format (1 = *strongly disagree* to 5 = *strongly agree*). Spurious effects are possible if controls are not added. Age, gender, race, and organizational tenure were used as control variables given their previous influence on strain variables (Sheridan & Vredenburgh, 1978).

Researchers (e.g., Royle et al., 2005; Watson & Clark, 1984; Watson, Clark, & Tellegen, 1988) have contended that both positive and negative affect would produce spurious findings. Because individuals with high negative affect (NA) tend to view themselves and the immediate environment with disdain (Watson & Clark, 1984), it is reasonable to expect that it will adversely affect their views of coworkers and impact decisions related to informal accountability for others. PA on the other hand, given its power to cause individuals to view the world through a rose- tinted lens, might cause individuals to be too eager to seek IAFO perhaps because they believe nothing bad could come of it. As such, both (PA) and (NA) were added as control variables.

We measured affective disposition using the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988). Respondents indicated the extent to which they experienced 10 positive (e.g., interested and determined) (α = .88) and 10 negative (α = .89) (e.g., distressed and hostile) emotions. A two-factor structure was supported for PANAS (eigenvalues = 5.92, and 3.37 for PA and NA respectively, proportion of explained variance = .46). Responses ranged from 1 (*very little or not at all*) to 5 (*extremely*).

Data Analyses

To determine if mediation existed in our data, we followed Baron and Kenny's (1986) three-step procedure. First, the independent variables should be significantly related to the mediator variables (i.e., IAFO regressed on self-regulation, embeddedness, and control variables). Second, the independent variables should be related to the dependent variable (i.e., OCB regressed on controls, self-regulation, and embeddedness). Finally, in the third step, the mediating variable should be related to the dependent variable with the independent variables included in the equation (IAFO added into the regression equation). If the first three conditions hold, at least partial mediation is present. If the independent variable has a non-significant beta weight in the third step and the mediator remains significant, then full mediation is present.

Results-Amalgam Sample

Table 1 provides the means, standard deviations, and intercorrelations among study variables. The single largest correlation between variables is between OCB and embeddedness (r = .543, $p < .01$). The correlations do not strongly indicate problems of multicollinearity. In no case does any correlation exceed the .60 benchmark noted by Cohen et al. (2003). Table 2 provides the means, standard deviations and intercorrelations for the organzationl sample.

Table 1: Means, Standard Deviations, and Intercorrelations –Amalgam Sample

	Trait	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1	Embeddeness	3.67	.617	-									
2	Positive Affect	3.84	.715	.443**	-								
3	Negative Affect	.169	.619	-.061	-.220*	-							
4	Self Regulation	3.88	.531	.332**	.179	-.184	-						
5	OCB	3.76	.533	.543**	.275**	.009	.168	-					
6	IAFO	3.49	.886	.306**	.200*	.062	-.065	.421**	-				
7	Tenure	7.37	8.018	.016	-.034	-.062	.027	.079	-.094	-			
8	Race	1.55	.863	-.072	-.079	.135	.064	-.015	-.006	.028	-		
9	Gender	.53	.505	-.115	-.063	-.030	-.156	-.013	.206*	-.156	.046	-	
10	Age	36.51	13.42	.017	-.126	-.098	-.225*	.060	-.261**	.363**	-.169	-.196*	-

*N= 187 ** p < .01,* p<.05*

Table 2: Means, Standard Deviations, and Intercorrelations –Organizational Sample

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1.	Embeddeness	3.62	.644	-									
2.	Positive Affect	3.71	.823	.330*	-								
3.	Negative Affect	1.77	.669	-.023	-.220**	-							
4.	Self Regulation	2.71	.480	.220*	.179	-.184	-						
5.	OCB	3.73	.560	.606**	.275**	.009	.168	-					
6.	IAFO	3.54	.734	.293**	.200*	.062	-.065	.421**	-				
7.	Tenure	1.28	.758	.027	-.034	-.062	.027	.079	-.094	-			
8.	Race	1.34	.633	-.130	-.079	.135	.064	-.015	-.006	.028	-		
9.	Gender	.51	.502	-.090	-.063	-.030	-.156	-.013	.206*	-.156	-.046	-	
10.	Age	20.97	1.71	.082	-.126	-.098	-.225*	.060	-.261**	.363**	-.169	-.196*	-

*N= 105 ** p < .01,* p<.05*

Regression Results

To test this study's hypothesis, we performed the three-step procedure as recommended by Baron and Kenny (1986) to test for mediation. In each of the three steps, the standard demographic control variables (i.e., age, race, and gender) as well as tenure and affective disposition (i.e., NA and PA) were included due to their potential impact on organizational citizenship behaviors and to provide a more stringent test of the relationships. Overall, the demographic controls were not consistently significantly related to OCB. However, positive affect was significantly related to citizenship at the $p < .05$ level.

Table 3a provides the results for the first step indicating that the mediating variable, informal accountability for others, was significantly related to both self-regulation ($b = .25$, $p < .01$), and embeddedness ($b = .47$, $p < .001$). Thus, we proceeded to the second step. Table 3b provides the results for this step and shows that both self-regulation ($b = .20$, $p < .01$) and embeddedness ($b = .40$, $p < .001$), are significantly related to the dependent variable (OCB). Further, self-regulation and embeddedness – links explained anywhere between 19-29% of the variance in OCB.

Table 3a: Amalgam Sample-Mediator Variable Regressed on the Independent Variables

Variable	*F*	*df*	*Adjusted R^2*	**β (standard)**
Mediator: IAFO	8.65***	7	.22	
Embeddedness				.47***
Self-Regulation	3.54**	7	.09	
				.25**

Table 3b: Amalgam Sample- Dependent Variable Regressed on Independent Variables

Variable	**F**	**df**	**Adjusted R^2**	**β (standard)**
Dep. Var: Org. Citizenship	7.11***	7	.19	
Self-Regulation				.20**
Dep. Var: Org. Citizenship	11.58***	7	.29	
Embeddedness				.40***

In the third step of Baron and Kenny's (1986) procedure, the mediating variables should be related to the dependent variables with the independent variables included in the equation. Table 3c provides results from the third step. As can be seen, IAFO was a strong predictor ($b = .25$, $p < .01$) of OCB, but self-regulation failed to show significance ($b = .10$, $p <$ n/s). This sudden lack of significance, according to Baron and Kenny's (1986), indicates that informal accountability for others fully mediates the relationship between self-regulation and organizational citizenship behaviors. With respect to embeddedness, IAFO predicted OCV ($b = .35$, $p < .001$) but embeddedness also significantly predicted ($b = .22$, $p < .01$) OCB. Baron and Kenny (1986) noted that if between the second and third steps the IV's beta weight drops and/or the significance level drops, the relationship is partially mediated. Such is the case here.

Table 3c: Amalgam Sample- Dependent Variable Regressed on Mediator (IAFO) with the Independent Variables Included

Variable	F	df	Adjusted R^2	β (standard)
Dep. Var: Org. Citizenship	13.52***	8	.35	
IAFO				.47***
Self-Regulation				.10 n/s
Dep. Var: Org. Citizenship	15.16***	8	.38	
IAFO				.35***
Embeddedness				.22**

*N = 187 *p<.05; **p<.01; ***p<.001 All results included age, race, gender, tenure, and affective disposition as control variables.*

METHOD – ORGANIZATIONAL SAMPLE

Participants and Procedures – Organizational Sample

We obtained approval to conduct research for the organizational sample at a recreation facility at a large university in the Southeast United States. The employees in this facility were mostly students.

The organizational sample data was collected using a dyadic research design in which employees responded to questionnaires coded to match supervisor evaluations. Two surveys were distributed. The supervisor survey gathered contextual performance data for each employee who completed the employee questionnaire. In fact, supervisors at this organization completed a survey for each of their employees regardless of whether that individual also submitted one. Supervisors and employees completed their surveys either at home or at times when they had a break at work.

The supervisors distributed surveys to employees in sealed envelopes. The employee could either return the survey in the mail (free of charge to employees) or, as was most often the case, could place it in a collection box in a sealed return envelope. We collected the completed surveys. The supervisors then created a file that contained all their completed surveys for subordinates. We collected these in person. Each of the four participating supervisors completed an average of 26 surveys for employees, all of whom they had known for at least three months.

We distributed only 125 surveys, one for each supervised employee. Of the 125 surveys only 20 were not returned, rendering a useable sample of 105. This is a response rate of 84%. The average age of respondents was 21 and the average organizational tenure was 1.3 years. The sample included 54 females (51%).

Measures – Organizational Sample

The exact measures and response formats used in the amalgam sample were given to employees in the organizational study. Reliability estimates were acceptable as were the results of confirmatory factor analysis: embeddedness (α = .79 and .72; eigenvalues = 2.58 and 1.80 for links and fit respectively, proportion of explained variance = .51), self-regulation (α = .79; eigenvalues =1.65, proportion of explained variance = .47), IAFO (α = .78; eigenvalue = 2.71, proportion of explained variance = .51), OCB (α = .80; eigenvalue = 2.08, proportion of explained variance = .59) and PANAS (eigenvalues = 5.92, and 3.37 for PA (α = .80) and NA (α = .80) respectively, proportion of explained variance = .46).

The questionnaire we administered to the supervisors only taps the performance dimensions of their subordinates, though some additional demographic information was collected. As such, the measure of OCB is the same as the one noted above with only the wording changed to reflect "the employee" as opposed to oneself. Four different supervisors evaluated the employees. These supervisors manage between 20 and 30 employees each.

Regression Results

As in the amalgam sample, we performed the three-step procedure as recommended by Baron and Kenny (1986) to test for mediation again, adding the standard demographic control variables (i.e., age, race, and gender) as well as tenure and affective disposition (i.e., NA and PA). Overall, the demographic controls were not consistently significantly related to OCB. However, positive affect again demonstrated strong effects on citizenship at the $p < .05$ level.

Table 4a provides the results for the first step, showing that the mediating variable, informal accountability for others, was significantly related to both self-regulation ($b = .39$, $p < .001$) and embeddedness ($b = .31$, $p < .01$). Thus, we proceeded to the second step. Table 4b provides these results. It shows that both self-regulation and embeddedness, were significantly related ($b = .23$; $p < .10$ and $b = .52$; $p < .001$ respectively) to the dependent variable (OCB). Further, self-regulation and embeddedness explained anywhere between 6-36% of the variance in OCB.

Table 4a: Organizational Sample- Mediator Variable Regressed on the Independent Variables

Variable	F	df	Adjusted R^2	β (standard)
Mediator: IAFO	3.75**	7	.16	
Embeddedness				.31**
Self-Regulation	13.37***	7	.18	
				.39**

Table 4b: Organizational Sample- Dependent Variable Regressed on Independent Variables

Variable	F	df	Adjusted R^2	β (standard)
Dep. Var: Org. Citizenship	1.97†	7	.06	
Self-Regulation				.23†
Dep. Var: Org. Citizenship	6.39***	7	.36	
Embeddedness				.52***

Table 4c provides results from the third step. As can be seen, IAFO was a strong predictor ($b = .31$; $p < .01$ and $b = .39$; $p < .001$) of OCB for embeddedness and self-regulation conditions respectively. However in this step, the beta weight for self-regulation dropped from significance in the equation ($b = .18$, $p <$ n/s), again indicating full mediation. In the embeddedness– IAFO- OCB equation, results differed. Even after IAFO was added in the third step, embeddedness-links still remained significant ($b = .51$, $p < .001$), thus not supporting full mediation (Baron & Kenny, 1986). However, according to these authors, a partially mediated relationship exists because the beta dropped from .59 to .51 between the second and third steps.

Table 4c: Organizational Sample- Dependent Variables Regressed on Mediator (IAFO) with the Independent Variables Included

Variable	F	df	Adjusted R^2	β (standard)
Dep. Var: Org. Citzenship	5.30***	8	.25	
IAFO				.46***
Self-Regulation				.18 n/s
Dep. Var: Org. Citizenship	7.66***	8	.34	
IAFO				.31**
Embeddedness				.42***

*N = 105 †p<.10, *p<.05; **p<.01; ***p<.001 All results included age, race, gender, tenure, and affective disposition as control variables.*

DISCUSSION

It was our objective to advance theory and research in the area of accountability in this paper. Specifically, this research is the first to propose and test a model that addresses the notion that individuals might pursue informal accountability for others, without formal charter, while considering antecedents and organizational consequences. The convergent findings that we have attained across two studies allow us to be more confident in the relationships proposed.

Our data indicated a consistent mediating effect of informal accountability for others in the self-regulation – OCB, and the embeddedness – OCB relationships in both an organizational and a self-report sample of adult workers. Although it might seem counterintuitive at the outset to believe that individuals would seek accountability conditions due to its association with psychological strain (e.g., Ferris, et al., 1995; Hall, Royle, Brymer, Perrewé, Ferris, & Hochwarter, 2006; Hochwarter, Perrewé, Hall, & Ferris, 2005), our data suggest that individuals do so anyway. A very plausible explanation for this fact relates to Van Scotter and Motowidlo's (1996) contention that citizenship behaviors are comprised of job dedication (e.g., self-motivated attempts to work diligently) and interpersonal facilitation (e.g., interpersonal actions that help others achieve). A high degree of embeddedness, both in terms of fit and linkages, revolves around the notion that individuals relate to a firm's core functions and ethical positions (i.e., fit) and playing one's proper part in a network partnership (i.e., links). As such, organizational members are inclined to overlook the potential strain that IAFO might incur in favor of engaging in behavior that shows them to be good team players.

Similarly, as Hogan and Ones (1997) noted, diligent attention to detail and efforts to work both more effectively and efficiently makes individuals look like better leaders. It is likely then that those who are best able to regulate themselves are those who are most efficient/effective. These individuals will also seek IAFO because it enhances both their reputation as leaders and prospects of promotion, provided they could properly influence others for whom they are informally accountable. In either case, these data suggest that individuals do seek to facilitate the work of others and they do so by becoming informally accountable for them.

Implications For Theory And Practice

It was our objective to advance theory and research in the area of accountability. Specifically, this research is the first to propose and test a model that addresses the notion that individuals might pursue informal accountability for others without formal charter expecting that both they and their organizations could benefit.

The field has documented the effects of social facilitation on organizations for a long time (e.g., Triplett, 1898, 1900; Zajonc, 1965). We must therefore address the notion that respondents behaved differently

because they were observed. Our data suggested that individuals do not seek informal accountability simply because others are present (Zajonc, 1965; Zajonc & Sales 1966), but others must be present in order to signal IAFO. Respondents expected that their supervisors would evaluate their performances against normative ground rules and with some implied consequences (e.g., would impact their ratings on routine performance evaluations) (Geen, 1991). The positive effects of informal accountability for others on OCB indicated that supervisors in the organizational sample noticed and rewarded this behavior, but certainly did not do so for all subordinates. This indicates that not everyone uniformly reacts when observed.

Prior research has generally focused on formal, objective, measures of accountability. For example, Ferris et al. (1995) noted that individuals respond to objective mechanisms like the rules of accounting, surveillance, stakeholder feedback, and performance evaluations. These mechanisms are necessary for proper organizational functioning but this research has helped broaden the scope of inquiry. Prior to these studies, no evidence had been brought to light that would help researchers determine if individuals choose to be accountable when they could otherwise hide from accountability's demands. Our data indicated that individuals who are highly embedded in their organizations and who possess the skills to work efficiently and effectively (i.e., regulate impulses to stray from tasks) might respond by choosing to become accountable for others, further bolstering their reputations as leaders and champions of their firms.

Morrison and Phelps (1999) cast responsibility for others as an extra-role activity manifested by individuals' decisions to take charge at work. In their conceptualization of responsibility for others, proactive changes were defined as beneficial. Although we cast informal accountability for others in a more neutral light, given a demonstrated potential for strain (e.g., Hall et al, 2006; Hochwarter, et al., 2005), our results suggested that under the proper antecedent conditions (i.e., self-regulation and embeddedness), IAFO could also be proactive and beneficial, despite the fact individuals know they are "on the hook" for others.

A clear implication of this research for HR professionals involves selecting employees based on the likelihood that they will seek informal accountability for others. Clearly an important antecedent to IAFO is organizational embeddedness. Although it takes time to establish linkages with others at work, the attitudes of potential employees can be solicited. Essentially we are addressing an issue of fit (Aurther, Bell, Villado, & Doverspike, 2006). Assessing applicants' person – organization fit, "the compatibility between people and organizations occurs when: (a) at least one entity provides what the other needs, (b) they share similar fundamental characteristics, or (c) both" (Kristof, 1996, p. 45) could help ensure that those who are selected share the organization's pro-social beliefs and are thus more likely to engage in valued citizenship behaviors.

Greenberger and Strasser (1991) noted that some individuals are inclined to enhance their senses of personal control by affecting, if not interfering with the actions of others. We contended that if informal accountability for others can be shown to pose a threat to one's ability to cope, organizations might expect employee interference in attempts to reduce uncertainty. Our results indicated that informally accountable individuals, instead of interfering with others (e.g., unduly meddling in how others do their jobs), were more likely to exhibit acts of organization and individual citizenship behaviors (e.g., come in early, stay late, and mentor new members).

A final practical implication of this research is related to the flattening of organizational structures and increasing spans of control (Cascio, 1995). When organizations reduce levels, accountability becomes more important due to a lack of authority and answerability relative to position power. Firms might attempt to select those high in informal accountability for others due to their likely acceptance of IAFO as an informal mechanism of corporate governance and because they engage in activities that benefit the organization (i.e., engaging in OCB).

Strengths, Limitations, and Future Research

The strengths of this research warrant discussion. Commonly in critiques of prior research, authors noted that the manner in which data on accountability were collected lacked a sense of realism, and thus concomitantly also lacked external validity (Frink & Klimoski, 1998, 2004). Specifically, researchers have relied too heavily on experiments rather than examining employees in an actual organizational setting (Frink & Klimoski, 1998, 2004). This research benefits from the fact that data were collected from working adults in organizations. It also benefits from the wide range of actual employees and occupations examined in the amalgam sample. Further, this enhances the comparisons that can be made with the organizational sample.

A notable strength of this research is its two-study design. The underlying appeal of this approach is that constructive replication of findings across studies permits researchers to make more rigorous external generalizations, especially if they differ from previous research (Schwab, 1999). The fact that this research indicated individuals sought IAFO despite a demonstrated potential for strain (e.g., Hall et al., 2006; Hochwarter et al, 2005) is particularly notable. Taken together, the findings in the amalgam and organizational samples increase validity. The validity of the claims made here is also strengthened by our use of paired dyads in the organizational sample. Using supervisor ratings of organizational citizenship behaviors helps eliminate the threat that individuals would evaluate themselves too favorably thus spuriously affecting the findings. In addition, the favorable response rate (84%) in the organizational sample bolsters our confidence that the opinions expressed by respondents are adequate representations of the organization as a whole. It also eliminates most concerns about response bias (i.e., there is a meaningful difference between organizational members who answered our surveys and those who did not).

Finally, the inclusion of affective disposition (e.g., NA and PA) in the analyses helps strengthen our claims. Controlling for trait affect is particularly helpful to this research in light of findings that self-regulation (e.g., focusing attention) promotes pleasant mood states (Burton et al, 2006; Reis et al., 2000). By controlling for affective disposition, we can be more confident that PA did not spuriously affect the hypothesized relationships, rather it was the pleasant psychological state associated with self-regulation that promoted IAFO.

Despite the significant findings and contributions to practice and theory that have been noted, there are limitations to this research that must be addressed. One limitation is that the data in each study came from a single source, self-report survey. Without estimating a common method variance (CMV) factor using structural equation modeling, we are unable to determine the extent to which CMV affected these two data sets (Widaman, 1985; Williams, Cote, & Buckley, 1989). Although CMV represents a threat to the validity of this study, examinations of both Tables 1 and 2 do not generally suggest spuriously inflated relationships due to response-response bias. Although we cannot completely rule out the possibility that artifacts generated some of the observed effects, based on the magnitude of the correlations, evidence suggests that common method variance was not unduly problematic in this research.

Despite the preponderance of acceptable inter-correlations, the correlation between OCB and embeddedness in the organizational sample is undesirably high (.606). The strength of this association could raise concerns about multicollinearity (Cohen, Cohen, West, & Aiken, 2003). However, there is a technique for delving deeper into the relationship between highly correlated variables that helps address this situation (Fornell & Larker, 1981). To assess if the constructs are distinct and acceptable, take the square of the correlation between OCB and embeddedness (.367) and compare it to the proportion of variance extracted in the CFA. If the square of the correlation is larger than the proportion of variance extracted, the scales are considered inadequate (Fornell & Larker, 1981). However, in this case, the variance extracted in OCB and embeddedness was .59 and .51 respectively, which is considerably larger

than .367 (the square of the correlation between them). Therefore, although not ideal, the use of these measures is still legitimate.

Another limitation of our findings relates to the sampling procedure. Specifically, in the amalgam sample, selection bias could be an issue because individuals seeking extra credit might have relied too heavily on family members and friends. It is possible these individuals complied as a cursory favor to the students. This allows for the possibility that respondents gave only a superficial treatment to the items in the survey as a means to appease their friends and family. We must also note this is a convenience sample, so generalizing the results of this study is tenuous. Indeed, it was this limitation in the amalgam study that made seeking the organizational sample necessary. The organizational sample employed paired dyads (supervisor and subordinate) in order to formulate more definitive statements regarding potential contextual or organizational influences. This is simply not possible in the amalgam sample.

Another possible limitation involves our choice of organizations. As discussed, the organization used in the current study represents a departure from most samples. Specifically, this organization operates on a college campus. As such, most of the employees were young relative to the general population. This could affect the nature and time frame of the job, thus, adversely impacting decisions to seek informal accountability for others (Somers, 1995). Additionally, the ratio of employees to supervisors was not ideal. On average, each supervisor evaluated 26 employees. Generally, it is desirable if supervisors evaluate a small number of employees. This unfavorable ratio raises questions of rater independence if supervisors rate large numbers of subordinates at the same time, thus potentially creating problems of differentiation between employees (Schermerhorn, Hunt, & Osborn, 2006). Nevertheless, this organization only had four supervisors.

In addition to the unfavorable ratio of employees to managers, the organizational sample is limited by its total size. Although we obtained a very favorable response rate (84%), only 105 surveys were collected, thus, the power and effect size in the organizational sample do not quite meet the a priori standards advocated by Cohen (1992) and Green (1991). Given the number of study variables (and controls) present in our regression analyses, we would have liked at least 130 respondents in order to meet Cohen's (1992) conventions for power and effect size. For a complete description of sample size calculation refer to Green (1991). Regrettably, that number is larger than the total number of employees in the participating organization (125).

This study also suffers from another limitation. It is a cross-sectional study. A frequent lament on the part of organizational researchers concerns the lack of longitudinal research design in field studies. Cross-sectional studies diminish the researchers' abilities to make more definitive statements of causality. It might be said that cross-sectional research is like trying to understand a movie by looking only at one still shot. A fundamental step in future research should be the longitudinal examination of the predictors of IAFO. Longitudinal designs would help clarify, for example, whether or not IAFO remains constant once the decision to signal it has been made.

Another possible avenue for future research relates to the effects of structure on individuals. A comparative study of organizational typologies might be useful. For example, future research might look at the number of layers (i.e., level of bureaucracy) as a predictor of linkages. Assuming that those in flatter organizations "wear more hats" and are thus accountable for more outcomes and proximally linked to others (Cascio, 1995; Kirkman & Shapiro, 1997), a natural next step would be to test if these individuals are more inclined to seek more informal accountability for others due to structural pressures. Would we expect to find more IAFO and citizenship behaviors in flat organizations as opposed to bureaucracies (which are generally more formal and legalistic, Sutton, Dobbin, Meyer, & Scott 1994)?

Decoupling different aspects of selected study variables might prove fruitful for future research as well. For example, scholars might seek to determine whether structural elements (links) or the individual values and ethical dispositions (fit) of embeddedness are disproportionately predictive of IAFO. Similarly, citizenship behaviors are comprised of job dedication (e.g., self-motivated attempts to work diligently) and interpersonal facilitation (e.g., interpersonal actions that help others achieve) (Van Scotter and Motowidlo, 1996). A reasonable extension of the current research would be to see if IAFO differentially predicts interpersonal facilitation or job dedication.

Researchers might also test the extent to which those who seek informal accountability for others promote themselves. Sedikides, Herbst, Hardin and Dardis (2002) noted that identifiability, under conditions of accountability, reduced the degree to which individuals withheld important information, took credit where it was not due, or distanced themselves psychologically from others. Given that those who are informally accountable for others must, by definition, be identifiable, future research should attempt to verify that those high in IAFO engaged in fewer self-serving behaviors than those low in IAFO.

Our data indicated that individuals felt answerable for others and they engaged in behaviors that signaled it. Research opportunities exist at the level of organizational and national culture that could be used to answer a fundamental question. How does culture shape individuals' views of informal accountability for others, and enable it, in terms of its social acceptability? Specifically, an application of Hofstede's (1980) dimensions of work-related values might be enlightening when studying IAFO in culturally diverse samples. Indeed, this has been a popular framework through which to view cultural differences. By applying this cultural framework, we expect that social influence tactics, like pursuing IAFO, are effective contingent upon the degree to which they map onto the basic values of a particular culture (i.e., individualistic v. collectivistic, masculine v. feminine, etc.).

CONCLUSION

Accountability is a construct that has drawn popular attention since the time of the Roman Empire. Indeed, accountability issues, lapses in particular, are commonplace in business media. However, researchers are still developing conceptualizations of accountability. To date, little research exists to inform the field about how, if, or why individuals would seek to become informally answerable for the attitudes and behaviors of their colleagues. Our research, though preliminary, indicates that individuals do indeed seek informal accountability for others. Furthermore, they are prompted to do so by their feelings of fit, network affiliations, and their abilities to pay attention to proper work cues in the environment.

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OPTIMAL BUY-BACK CONTRACTS WITH ASYMMETRIC INFORMATION

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ABSTRACT

When demand is uncertain and it is costly for the retailer to forecast demand information more accurately, the supplier faces a moral hazard problem. The supplier wishes to induce the retailer to forecast more accurate information which will improve the total profit of the supply chain. This paper provides a theoretical analysis of the optimal buy-back contract, in which the supplier chooses the wholesale and buy-back price to maximize his profits given that the retailer's inventory order level and private information acquisition decision are both chosen to maximize the retailer's profits. In contrast to the standard buy-back contract model in which the first best of the system can always be implemented, our model suggests that the supplier pays not only the cost of acquiring information, but also the information rent to induce the retailer to invest in acquiring information. Consequently, the first best of the system cannot be always implemented. Our model explains that Vendor Managed Inventory systems are prevalent while the retailer is better informed than the supplier. Nevertheless, the standard buy-back contract theory contradicts with the empirical facts.

KEYWORDS: forecast demand, asymmetric information, vender inventory systems, optimal buy-back

JEL: C60, D8, M11

INTRODUCTION

We consider a vertical system consisting of an upstream firm that sells through a downstream firm facing uncertain demand. Suppose the upstream firm is the supplier, the downstream firm the retailer. As is standard in the literature (see especially Pasternack, 1985), the supplier is limited to a uniform wholesale and a uniform buy-back price, the retailer's quantity level (inventory level) is not contractible, and the retailer faces an exogenous retail price. To avoid the double marginalization of the decentralized system, return for full or partial credit is offered to the downstream firm. The first best can be implemented if the buy-back contract is well designed.

In many situations, the retailer is better informed about demand information than the supplier. Kulp (2002) considers the precision and reliability of information and the retailer's willingness and ability to share information, and how that will affect the way manufacturers and retailers structure their relationship. Since she uses a price-only contract, double marginal cost is generated when the retailer makes a decision, despite the fact that the retailer has more precise information. This situation differs from that when the supplier makes a decision to overcome double marginal cost based on less precise information. But if we allow a return policy, the supplier can give adequate wholesale prices and buy-back rates, and the first best can be implemented in case the retailer makes a quantity decision when he is better informed. This means the traditional buy-back system dominates the VMI (Vendor Managed Inventory) system, which is not optimal in this situation. As a result, these findings contradict the empirical results of Kulp (2002). In contrast, our theoretical findings in this paper are consistent with these empirical results.

We go beyond this basic framework by considering moral hazard problem for the retailer to forecast more accurate demand information. Whether the retailer obtains information more accurately is unobservable. The supplier chooses the wholesale and buy-back price to maximize his profits, given that the retailer's

inventory order level and information acquisition decision are both chosen to maximize the retailer's profit. This optimal buy-back contract remains a challenging problem. The approach in Pasternack (1985) to solve for the optimal buy-back contract does not work here. As shown in our paper, the first best outcome of the system can not always be implemented; therefore a necessary condition for this approach fails. Lariviere (1999) shows that the standard first order condition method which is used in solving standard optimal contract does not work in buy-back contract problem because the Hessian of the supplier's profit is positive. In this paper, we provide method to study this problem.

LITERATURE REVIEW

The role of information on contracting in a vertical system has been an important topic in economics and marketing. Rey and Tirole (1986) model the tradeoff between the manufacturer's desire to provide insurance to retailers and his desire to avoid agency costs. Desiraju and Moorthy (1997) show how performance requirements may improve the working of a distribution channel when the retailer is better informed about demand conditions than the manufacturer. Ha (2001) considers the problem of designing a contract to maximize the supplier's profit in a one-supplier, one-buyer relationship for a short-life-cycle product under asymmetric cost information. Blair and Lewis (1994) consider the optimal retail contracts with asymmetric information and moral hazard. Lariviere (2002) examines both the price-based returns mechanism and the quantity-based returns mechanism when there is a positive probability that the retailer is capable of gaining improved demand information through costly forecasting. He shows that buy- backs generally result in greater supplier profit than quantity flexibility contracts unless forecasting is very expensive. A return policy can be implemented via prices (Pasternack, 1985; Donohue, 2000) or quantity limits (Pasternack, 1985; Tsay, 1999). Under either, the first best outcome of the system can be implemented.

Kulp (2002) considers the precision and reliability of information and the retailer's willingness and ability to share information and how that will affect the way manufacturers and retailers structure their relationship. She uses a price-only contract and double marginal cost can explain her empirical results. However, firm can offer buy-back contracts to overcome the double marginality. Our results are consistent with these empirical findings with buy-back contract.

THE BASIC MODEL

The following are some notations we will use in this paper:

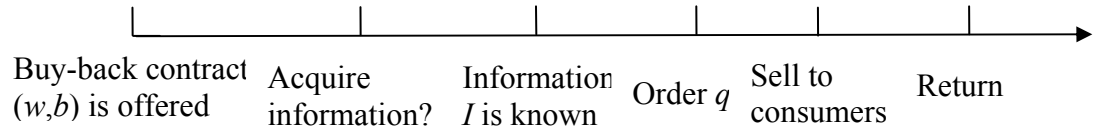
p: the market price of the retailer.
c: the production cost per unit.
q: the quantity that the retailer orders from the supplier.
w: the wholesale price of the supplier to the retailer.
b: the buy-back price of the supplier.
e: the cost to invest in acquiring information.
D: the number of consumers willing to pay the exogenous price.
P_h: the prior probability that the market demand is high.
P_l: the prior probability that the market demand is low.
θ: the posterior probability that the market demand is high if the good news is received.
Π: the joint profit of the system.
π_r: the profit of the retailer.
π_s: the profit of the supplier.
I: the information that is available to retailer. $I \in \{0,1,2\}$. 0 means the retailer receives no information; 1 means the retailer receives good information, which indicates the market demand is high; 2 means the retailer receives bad information, which means the market demand is low.

In this model, there is an upstream firm and a downstream firm in the market. We will call the upstream firm a supplier and the downstream firm a retailer. The supplier produces products and sells through the retailer. The retailer sells the product to the consumer at a fixed price p.

The timing is as shown in Figure 1:

1. The supplier offers a buy-back contract (w,b) where w is the wholesale price and b is the buy-back price. We suppose both w and b are constant. (We will discuss possible generalizations later.)
2. The retailer decides to accept or reject the contract.
3. If the retailer accepts the contract, he will decide whether to invest in acquiring information. It costs him e to retrieve the information. If he does not invest in acquiring information, the cost is 0. If the retailer rejects the contract, the game is over and the profits of both the supplier and the retailer are 0.
4. If the retailer invests in acquiring information, he obtains the information $I \in \{1,2\}$, where I=1 means he received good news and I=2 means he received bad news. If he did not invest in acquiring information, the information he has is I=0.
5. Based on the information I, the retailer decides the quantity q to order to maximize his expected profit.
6. Uncertainty is realized. The retailer returns the remaining inventory to the supplier at price b.

Figure 1: Timing



We assume demand is D, which is a binary discrete distribution. The prior probabilities are that $Prob(D=h)=P_h$ and $Prob(D=l)=1-Prob(D=h)=P_l$.

After the retailer receives information I, he can update his information and the posterior probabilities are $Prob(h|I)$ and $Prob(l|I)$, where $Prob(h|I=1)>$ Prob(D=h) and Prob(l|I=2)> Prob(D=l). Thus we identify I=1 as good news and I=2 as bad news. Denote Prob(h|0)= Prob(h) and Prob(l|0)= Prob(l). We assume the information is private information so the supplier cannot observe I.

Without loss of generality, we assume the reserve profit level of the retailer is 0. The retailer's profit is 0 if he rejects the contract. But for any contract, he can always at least get a profit of 0 by ordering a quantity of 0 and do nothing else if he accepts the contract. He can always accept the contract under this assumption. To simplify this model we can assume, without loss of generality, the salvage value is 0 for both parties and the selling cost of the retailer is 0.

Given the timing in our model, there exists a very easy solution to the incentive problem that we study. The upstream firm could sell the whole firm to the downstream firm, demanding a payment just low enough to induce the retailer to accept the contract. Once this transaction takes place, the downstream firm will choose the first best quantity level. Such lump-sum extractions are rarely observed in practice.

The reasons are as follows: First, the upstream firm may face more than one downstream firm. Second, the budget of the downstream firm is constrained. Third, the upstream firm may need in its production some special investment, for example, human capital, which cannot be transferred to the downstream firm directly. Fourth, if there is hidden information for the supplier, the retailer will face agency costs. We assume that the only payments between supplier and retailer are made at a fixed wholesale price and fixed return price (linear price), which are widely used in practice.

Symmetric Information: Optimal Wholesale Prices without Buy-Back

First, we consider the supplier's strategy without buy-back. We can have better idea why a buy-back contract is interesting and how a buy-back contract works.

We consider the joint profit of the system. That is

$$\prod = \max_q \prod(q) = \max_q E\{p\min(D,q) - cq\} \tag{1}$$

When there is no information available and the inventory level is q, the profit of the system is as follows:

$$\Pi(q) = \begin{cases} (p-c)q & q < l \\ pl - cl + (pP_h - c)(q-l) & l \le q < h \\ (P_h h + P_l l)p - cq & h \le q \end{cases} \tag{2}$$

Denote the first best inventory level as q^f. We have

$$q^f = \arg\max_q \prod(q) \tag{3}$$

If the best response set is a correspondence that has more than one solution, for simplification, we suppose that the highest possible inventory will be chosen. Therefore the first best inventory level is as follows:

$$q^f = \begin{cases} h & pP_h - c \ge 0 \\ l & pP_h - c < 0 \end{cases} \tag{4}$$

In a decentralized vertical system, the supplier will sell through the retailer. Given the wholesale price w, the retailer chooses his quantity level q to order, and the profit is as follows:

$$\pi_r(q) = \begin{cases} (p-w)q & q < l \\ pl - wl + (pP_h - w)(q-l) & l \le q < h \\ (P_h h + P_l l)p - wq & h \le q \end{cases} \tag{5}$$

Denote the optimal inventory level for the retailer as $q^o(w)$. We have

$$q^o(w) = \arg\max_q \pi_r(q) \tag{6}$$

For $c \le w \le p$, the optimal inventory level is

$$q^o(w) = \begin{cases} h & pP_h - w \ge 0 \\ l & pP_h - w < 0 \end{cases} \tag{7}$$

Based on this best response function of the retailer, the supplier will choose the wholesale price w to maximize his profit:

$$\max_w (w-c)q^o(w) \tag{8}$$

Consequently the optimal wholesale price is

$$w = \begin{cases} pP_h & (pP_h - c)h \ge (p-c)l \\ p & (pP_h - c)h < (p-c)l \end{cases} \tag{9}$$

Proposition 1-*If and only if* $P_h \ge \frac{pl + c(h-c)}{ph}$ or $P_h < \frac{c}{p}$*, in equilibrium, the retailer will purchase the first best quantity level when the upstream firm uses a price-only contract.*

Proof. First, we want to show that $P_h \ge \frac{pl + c(h-c)}{ph}$ or $P_h < \frac{c}{p}$ are necessary conditions. That is, if $\frac{pl + c(h-c)}{ph} > P_h \ge \frac{c}{p}$, the retailer will not purchase the first best inventory in equilibrium.

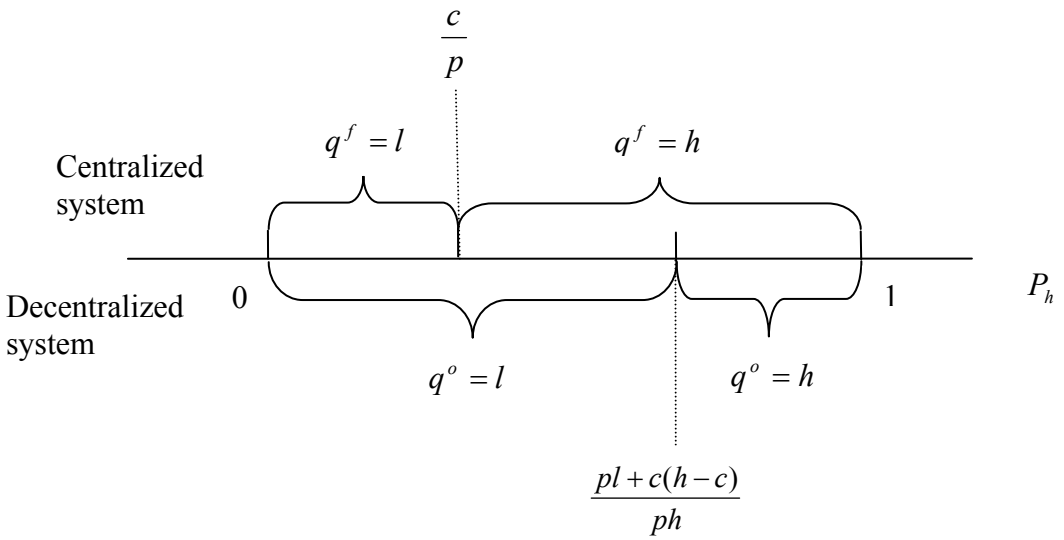
When $P_h \ge \frac{c}{p}$, we have $pP_h - c \ge 0$. From equation (4), we know that $q^f = h$. But $\frac{pl + c(h-c)}{ph} > P_h$ means $(pP_h - c)h < (p-c)l$. From equation (9), we have $w=p$. From equation (7), we have $q^o(w) = l$. So $q^o(w) \ne q^f$.

Then, we want to show that $P_h \ge \frac{pl + c(h-c)}{ph}$ or $P_h < \frac{c}{p}$ are sufficient conditions. That is, in equilibrium the retailer purchases the first best inventory.

When $P_h \ge \frac{pl + c(h-c)}{ph}$, we have $w = pP_h$ and $q^o(w) = h = q^f$. When $P_h < \frac{c}{p}$, we have $w = p$ and $q^o(w) = l = q^f$. So the first best outcome can be obtained in the decentralized system.

In addition, it is easy to check that $\frac{pl + c(h-c)}{ph} > \frac{c}{p}$. In a decentralized vertical system, because of the double marginalities, in equilibrium the retailer will not purchase the first best inventory level if $\frac{pl + c(h-c)}{ph} > P_h > \frac{c}{p}$ given that the upstream firm uses a price-only contract in equilibrium. The distortion exists.

Figure 2: Centralized and Decentralized Systems



Optimal Buy-Back Contracts under Symmetric Information

In the buy-back contract context, the retailer can return the remaining inventory at the buy-back price to the supplier. Given the wholesale price w and the buy-back price b, the objective function of the retailer is the following:

$$\max_q \pi_r(w,b,q) = \max_q E\{p\min(D,q) - wq + b\max(0,q-D)\} \tag{10}$$

The supplier will choose the wholesale price w and buy-back price b to maximize his profit. Thus the objective function of the supplier is

$$\max_{w,b} \pi_s(w,b) = \max_{w,b} E\{wq(w,b) - b\max(0,q(w,b)-D)\} \tag{11}$$

Subject to

$$q(w,b) = \arg\max_q \pi_r(w,b,q) \tag{12}$$

We can rewrite equation (10) as

$$\max_q \begin{cases} (p-w)q & q < l \\ pl - wl + (pP_h - w + bP_l)(q-l) & l \le q < h \\ (hP_h + lP_l)(p-b) - (w-b)q & h \le q \end{cases} \tag{13}$$

Denote the optimal quantity as $q^o(w,b)$. For $b \le w \le p$, we have

$$q^o(w,b) = \begin{cases} h & pP_h + bP_l - w \ge 0 \\ l & pP_h + bP_l - w < 0 \end{cases} \tag{14}$$

So the maximized profit of the retailer is

$$\pi_r(w,b) = \begin{cases} (p-w)l + (pP_h - w + bP_l)(h-l) & pP_h + bP_l - w \ge 0 \\ (p-w)l & pP_h + bP_l - w < 0 \end{cases} \tag{15}$$

In this situation, the profit of the supplier is

$$\pi_s(w,b) = E\{wq^o(w,b) - b\max(0, q^o(w,b) - D)\} \tag{16}$$

We are interested in the first best outcome of the vertical system. From Proposition 1, we know that if some conditions of demand distribution are satisfied, the retailer will purchase the first best quantity when the supplier uses a wholesale price-only contract. But that depends on the distribution of demand function. Here, we want to find the contract that does not depend on the distribution function of demand so the retailer will purchase the first best quantity independent of the distribution function.

Theorem 1 *When the information is complete, if the supplier offers a contract* $\{w_\upsilon, b_\upsilon\}$ *where*

$$w_\nu = p(1-\nu) + c\nu \ \text{ and } \ b_\nu = p(1-\nu) \tag{17}$$

and $0<\upsilon<1$*, then the retailer orders the first best quantity, i.e.* $q^o(w_\upsilon, b_\upsilon) = q^f$*. The retailer's profit is* $\pi_r(w_\upsilon, b_\upsilon) = \upsilon\Pi$*. The supplier's profit is* $\pi_s(w_\upsilon, b_\upsilon) = (1-\upsilon)\Pi$*.*

Proof. From equation (17), we have that

$$pP_h + bP_l - w = (pP_h - c)\nu \tag{18}$$

Since $0<\upsilon<1$, we have $sign(pP_h + bP_l - w) = sign(pP_h - c)$. Comparing equation (4) with equation (14), we have $q^o(w) = q^f$. For each sold product, the marginal revenues for the supplier and retailer are $(p-c)(1-\nu)$ and $(p-c)\nu$ respectively. While for each unsold product, the marginal revenues for the supplier and retailer are $-c(1-\nu)$ and $-c\nu$. So retailer profit is $\pi_r(w_\upsilon, b) = \upsilon\Pi$, and supplier profit is $\pi_s(w_\upsilon, b_\upsilon) = (1-\upsilon)\Pi$.

A similar result can be found in Pasternack (1985) when demand distribution is continuous. This theorem is a restatement of his result for the discrete situation.

When the partition of the profit between retailer and supplier is given, the optimal buy-back contract is unique when demand distribution is continuous. But by Proposition 1, this contract cannot always be unique for the discrete distribution. The outcome under the optimal contract in Theorem 1 is the first best, and the optimal contract does not depend on the distribution function of demand.

Intuitively, the retailer will purchase the first best quantity level if the wholesale price and the buy-back price are well designed. The supplier and the retailer share the first best profit of the system by the proportion (1-υ) and υ respectively. Since the wholesale and buy-back prices are set by the supplier, υ is then determined by the supplier. When the supplier wants to maximize his profit, he can set the wholesale price and buy-back price as $w_\nu = p(1-\nu)+c\nu$ and $b_\nu = p(1-\nu)$ with υ close to 0. In this case, we notice that both the wholesale price and buy-back price are close to *p*. The profit of the retailer is close to 0.

Corollary 1 *When I is common knowledge, the optimal buy-back contract for the supplier is* $w_\nu = b_\nu = p$. *In this case the contract is* $w_\nu = p(1-\nu)+c\nu$, $b_\nu = p(1-\nu)$ *and let* $\nu \to 0$ *so w=b=p is the limit situation. Then the supplier gets the first best profit of the whole system and the retailer's profit is 0.*

When the supplier is the principal, there are two approaches for him to implement the first best of the system: Vendor Managed Inventory System (VMI) allows the supplier to make quantity decision and the buy-back contract allows the retailer to make quantity decision. From the equation (17), the optimal buy-back contract does not depend on the distribution function of the supplier. Hence the retailer will make decision depending on his demand information only.

When the demand information is the common knowledge, both VMI system and buy-back contract can implement the first best and they are equivalent for the supplier. When the supplier has more accurate prior demand information, VMI system can obtain the first best based on supplier's information so that VMI system is superior to buy-back contract. But when the retailer has more accurate prior demand information, the buy-back contract can obtain the first best based on retailer's information, therefore the optimal buy-back contract is superior to VMI system. In practice, we find the VMI system is prevalent even when the retailer can have an easier access to more accurate information. Since it is costly for the retailer to invest in acquiring information, we need consider not only the cost of acquiring information but also the information rent due to asymmetric information.

Optimal Contracts under Asymmetric Information: Incentives for Information Acquisition

Then we consider the consequences of asymmetric information. We assume the supplier does not know whether the retailer has invested in acquiring the information or what kind of information he held.

Denote $\pi_r(w,b,I)$, $\pi_s(I)$, and $\Pi(I)$ as the profits of the retailer, the supplier and the system conditional on the information *I* respectively. When *I*=0, the symmetric information situation occurs as we have discussed.

We now simplify the analysis by assuming that P_h=P_l=1/2 and $\theta = \Pr ob(h \mid I=1) = \Pr ob(l \mid I=2) > 1/2$.

The information is generated as follows:

When the real demand is high, the probability of generating good news is γ and the probability for the bad news is $1-\gamma$. That is $\Pr ob(I=1 \mid h) = \gamma$. On the other hand, when the real demand is low, the probability of generating bad news is γ and the probability of generating good news is $1-\gamma$. That is $\Pr ob(I=0 \mid l) = \gamma$.

In this case, when the retailer invests in acquiring information, the probability of receiving good news is $\frac{1}{2}$ and the probability of receiving bad news is $\frac{1}{2}$.

Given the contract the supplier offered, the retailer will decide whether or not to invest in acquiring information. The retailer would like to retrieve information only if he is better off when he does so. We assume that if the retailer is indifferent between acquiring information or not, he always acquires information. The incentive compatibility constraints should be satisfied. If the given contract (w,b) satisfies $\frac{1}{2}\pi_r(w,b,1)+\frac{1}{2}\pi_r(w,b,2)-e\geq\pi_r(w,b,0)$, the retailer will be better off if he invests in acquiring information. While if the given contract (w,b) satisfies $\frac{1}{2}\pi_r(w,b,1)+\frac{1}{2}\pi_r(w,b,2)-e<\pi_r(w,b,0)$, the retailer will be worse off if he invests in acquiring information. Therefore we can divide the available set into two categories: Ω_Y and Ω_N. The former is the set of contracts given that the retailer will invest in acquiring information. That is $\Omega_Y=\{(w,b):\frac{1}{2}\pi_r(w,b,1)+\frac{1}{2}\pi_r(w,b,2)-e\geq\pi_r(w,b,0)\}$. The latter is the set of contracts given that the retailer will not invest in acquiring information. That is $\Omega_N=\{(w,b):\frac{1}{2}\pi_r(w,b,1)+\frac{1}{2}\pi_r(w,b,2)-e<\pi_r(w,b,0)\}$.

The supplier will choose the optimal contract to maximize his profit given the retailer's reaction. First, we consider the case that in equilibrium the supplier will not induce the retailer to invest in acquiring information. We have

Corollary 2 *If the supplier chooses a contract that does not induce the retailer to invest in acquiring information in equilibrium, then that contract is* $w_v=b_v=p$. *In this case, the supplier gets the first best profit of the whole system conditional on not knowing additional information. The retailer's profit is 0.*

That is, if the optimal contract $(w,b)\in\Omega_N$ in equilibrium, then that contract is $w_v=b_v=p$. Denoting the profit of the retailer as π_s^N, we have

$$\pi_s^N=\Pi(0) \tag{19}$$

That is,

$$\pi_s^N=\begin{cases}(p-c)l & if \quad \frac{p}{2}-c<0\\ pl+\frac{1}{2}p(h-l)-ch & if \quad \frac{p}{2}-c\geq 0\end{cases} \tag{20}$$

Intuitively, if the retailer does not invest in acquiring information in equilibrium, the symmetric information situation occurs as we have discussed. The supplier will try to set the optimal wholesale price and the optimal buy-back price as in Theorem 1. The retailer will purchase the first best quantity at the same time. The optimal buy-back contract for the system does not depend on distribution of demand. To maximize his profit, the supplier will choose the wholesale price and the buy-back price close to 0. Hence the retailer's profit is close to 0.

Since the retailer's reserve utility is 0, and he cannot retrieve information and order quantity 0, the retailer will always accept the contract in our model.

We consider the case that the retailer would like to invest in acquiring information voluntarily. If the supplier chooses contracts $(w,b) \in \Omega_Y$ to induce the retailer to retrieve information, the supplier's problem can be stated as follows:

$$\begin{aligned} &\max_{w,b} \frac{1}{2}\pi_s(w,b,1) + \frac{1}{2}\pi_s(w,b,2) \\ = &\max_{w,b} \frac{1}{2}E\{wq(w,b,1) - b\max(0, q(w,b,1) - D) \mid 1\} + \\ &\frac{1}{2}E\{wq(w,b,2) - b\max(0, q(w,b,2) - D) \mid 2\} \end{aligned} \tag{P1}$$

Subject to

$$\frac{1}{2}\pi_r(w,b,1) + \frac{1}{2}\pi_r(w,b,2) - e \geq \pi_r(w,b,0) \tag{IC-1}$$

and

$$q(w,b,I) = \arg\max_q E\{p\min(D,q) - wq + b\max(0, q - D) \mid I\} \tag{IC-2}$$

We can simplify the equation (IC-2) as follows:

$$q(w,b,I) = \begin{cases} h & if \quad p\,\mathrm{Pr}ob(h \mid I) + b\,\mathrm{Pr}ob(l \mid I) - w \geq 0 \\ l & if \quad p\,\mathrm{Pr}ob(h \mid I) + b\,\mathrm{Pr}ob(l \mid I) - w < 0 \end{cases} \tag{IC-2'}$$

Further more, we can show that the IC constraint of the retailer (IC-1) is binding.

Proposition 2 *A necessary condition for the optimal contract* $(w,b) \in \Omega_Y$ *in equilibrium is that the IC constraint of the retailer (IC-1) is binding in equilibrium. Hence (IC-1) can be replaced by*

$$\frac{1}{2}\pi_r(w,b,1) + \frac{1}{2}\pi_r(w,b,2) - e = \pi_r(w,b,0) \tag{IC-1'}$$

Proof. If $(w,b) \in \Omega_Y$, the retailer will invest in acquiring information in equilibrium. We suppose that the retailer's constraint (IC-1) is not binding in equilibrium. Then the problem is equivalent to equation (P1) subject to (IC-2'). In this situation, similar to Theorem 1, the supplier can maximize his profit by setting the wholesale price and buy-back price as $w_\nu = p(1-\nu) + c\nu$ and $b_\nu = p(1-\nu)$ with υ close to 0. The supplier gets the profit of the system with complete information. The expected profit of the retailer is 0, but the cost to retrieve the information is e>0. This is contradictory to (IC-1) since $\pi_r(w,b,0) \geq 0$.
In addition, we have

Theorem 2 *Necessary conditions for the optimal contract* $(w,b) \in \Omega_Y$ *in equilibrium are*

$$q(w,b,1) = h \tag{20}$$

$$q(w,b,2) = l \tag{21}$$

In other words, if in equilibrium the supplier chooses a contract which induces the retailer to exert effort, the retailer will choose a high level of inventory if he received good news and a low level of inventory if he received bad news.

Proof. If $(w,b) \in \Omega_N$, by corollary 2, we have $\pi_s(0) = \Pi(0)$ in equilibrium. Denote the first best quantity level as $q^f(0)$. When $\frac{p}{2} - c \geq 0$, from equation (4), we have $q^f(0) = h$. If $(w,b) \in \Omega_Y$, since $\theta = \Pr ob(h \mid I = 1) = \Pr ob(l \mid I = 2) > 1/2$ and the IC constraint (IC-2'), we know $q(w,b,1) \geq q(w,b,2)$. We want to show that $q(w,b,1) = q(w,b,2)$ is not true in equilibrium. Suppose $q(w,b,1) = q(w,b,2)$ is true in equilibrium. There are two possibilities: $q(w,b,1) \geq q(w,b,2) = h$ or $q(w,b,1) \geq q(w,b,2) = l$. For both cases, we have $\frac{1}{2}\pi_s(1) + \frac{1}{2}\pi_s(2) \leq \Pi(0) - e < \pi_s(0)$ since e>0. The supplier will not induce the retailer to retrieve information. It is not equilibrium. When $\frac{p}{2} - c < 0$, similar reasoning works. We have the contradiction.

Using Theorem 2, the equation (IC-2)' becomes the following:

$$q(w,b,0) = \begin{cases} h & if \quad \frac{p+b}{2} - w \geq 0 \\ l & if \quad \frac{p+b}{2} - w < 0 \end{cases} \qquad \text{(IC-2-0)}$$

$$q(w,b,1) = h \qquad \text{(IC-2-1)}$$

$$q(w,b,2) = l \qquad \text{(IC-2-2)}$$

Intuitively, supplier can be better off only if the performance of the whole system is better off. This means the information is "valuable", i.e. it can help the retailer's decision. Because it is costly to retrieve information, the added value by acquiring information should be able to cover the cost of inducing the retailer to invest in information acquiring.

When $(w,b) \in \Omega_Y$, the equation (IC-2-2) shows that if the given contract (w,b) satisfies $\frac{p+b}{2} - w \geq 0$, it is optimal for an uninformed retailer to choose a high inventory level to maximize his own profit. If the given contract (w,b) satisfies $\frac{p+b}{2} - w < 0$, it is optimal for an uninformed retailer to choose a low inventory level. Therefore we can divide the set of contracts Ω_Y into two sub-sets: Ω_h and Ω_l. The former is the sub-set of contracts under which the optimal inventory for an uninformed retailer is high. That is $\Omega_h = \{(w,b) : \frac{p+b}{2} - w \geq 0\}$. The latter is the sub-set of contracts under which the optimal inventory for an uninformed retailer is low. That is $\Omega_l = \{(w,b) : \frac{p+b}{2} - w < 0\}$.

Substituting (IC-2-1) and (IC-2-2) into equation (P1), we can rewrite equation (P1) as follows:

$$\max_{w,b} wl + \frac{1}{2}[w - b(1-\theta)](h-l) - c\frac{h+l}{2} \qquad \text{(P2)}$$

Substituting (IC-2,0), (IC-2-1) and (IC-2-2) into equation (IC-1') and using notation Ω_h and Ω_l, we can rewrite equation (IC-1') as follows:

$$\begin{cases} p(1-\theta)+b\theta+\dfrac{2e}{h-l}=w & \forall (w,b)\in\Omega_h \\ p\theta-w+\dfrac{b}{2}(1-\theta)=\dfrac{2e}{h-l} & \forall (w,b)\in\Omega_l \end{cases} \tag{IC}$$

Since the IC constraints have different formulae when (w,b) belong to different available sets, we need solve this problem in each set and find the solution, which is the maximization of both.

Proposition 3 *The optimal contract for (P2) subject to the constraint* $(w,b)\in\Omega_h$ *is*

$$b_h = p-\frac{2e}{(\theta-\frac{1}{2})(h-l)} \tag{22}$$

and

$$w_h = p-\frac{e}{(\theta-\frac{1}{2})(h-l)} \tag{23}$$

Proof. If $(w,b)\in\Omega_h$ is in equilibrium, the problem (P2) becomes

$$\max_{w,b} wl+\frac{1}{2}[w-b(1-\theta)](h-l)-c\frac{h+l}{2} \tag{P-h}$$

Subject to

$$p(1-\theta)+b\theta+\frac{2e}{h-l}=w \tag{IC-h}$$

and

$$\frac{p+b}{2}-w\geq 0 \tag{h}$$

The solutions to this problem are the equations (22) and (23).

From Proposition 3, we have $\pi_s(w,b)\leq\pi_s(w_h,b_h)$ for any $\{w,b\}\in\Omega_h$.

Since Ω_l is not a closed set, we can define $\overline{\Omega}_l=\{(w,b):\frac{p+b}{2}-w\leq 0\}$. We know $\Omega_l\subset\overline{\Omega}_l$. We have

Proposition 4 *The optimal contract for (P2) subject to* $(w,b)\in\overline{\Omega}_l$ *is also given by equations (22) and (23), i.e.*

$$b_l = p-\frac{2e}{(\theta-\frac{1}{2})(h-l)}=b_h \tag{24}$$

And

$$w_l = p - \frac{e}{(\theta - \frac{1}{2})(h-l)} = w_h \tag{25}$$

Proof. If $(w,b) \in \overline{\Omega}_l$ is in equilibrium, the problem (P2) becomes

$$\max_{w,b} wl + \frac{1}{2}[w - b(1-\theta)](h-l) - c\frac{h+l}{2} \tag{P-l}$$

subject to

$$p\theta - w + \frac{b}{2}(1-\theta) = \frac{2e}{h-l} \tag{IC-l}$$

and

$$\frac{p+b}{2} - w \le 0 \tag{l}$$

The solutions for this problem are equations (24) and (25).

Since $\Omega_l \subset \overline{\Omega}_l$, equations (24) and (25) are clearly the solutions to the (P2) subject to the constraint $(w,b) \in \Omega_h \cup \Omega_l$. If the supplier induces the retailer to invest in acquiring information in equilibrium, the retailer would have chosen *h* if he has not acquired information.
We have

Theorem 3 *If in equilibrium, the supplier chooses a contract that induces the retailer to invest in acquiring information, then the contract* (w,b) *satisfies*

$$w = \frac{p+b}{2} \tag{26}$$

In addition, we have

$$b = p - \frac{2e}{(\theta - \frac{1}{2})(h-l)} \tag{27}$$

and

$$w = p - \frac{e}{(\theta - \frac{1}{2})(h-l)} \tag{28}$$

Proof. We can verify that equations (27) and (28) maximize supplier profit subject to the (IC) constraint. As a result they will also maximize supplier profit under constraints (IC-1) and (IC-2). That is, they are optimal contracts if the supplier induces the retailer to invest in acquiring information in equilibrium. We can check that $w = \frac{p+b}{2}$ directly from equations (27) and (28).

Theorem 3 shows that if the supplier chooses an optimal contract that induces the retailer to invest in acquiring information in equilibrium, the profit of the supplier is:

$$\pi_s = wl + \frac{1}{2}[w - b(1-\theta)](h-l) - c\frac{h+l}{2} \tag{29}$$

where *b* and *w* are defined in equations (27) and (28).

Bringing equations (27) and (28) into equation (29), we can simplify the supplier's profit as

$$\pi_s(e) = pl + \frac{1}{2}p\theta(h-l) - \frac{e}{(\theta-\frac{1}{2})(h-l)}[l + \frac{2\theta-1}{2}(h-l)] - c\frac{h+l}{2} \tag{30}$$

We can define *e** by the following equation:

$$\pi_s(e^*) = \pi_s{}^N \tag{31}$$

We have

Proposition 5 *In equilibrium, the optimal contract is* $w = p - \frac{e}{(\theta-\frac{1}{2})(h-l)}$ *and* $b = p - \frac{2e}{(\theta-\frac{1}{2})(h-l)}$ *if and only if the cost of effort is* $e \le e^*$.

Proof. Since $l + \frac{2\theta-1}{2}(h-l) > 0$, from equation (30), we have $\frac{\partial \pi_s(e)}{\partial e} < 0$. That is, $\pi_s(e)$ is a decreasing function of *e*. From equation (31), we know that $\pi_s(e) \ge \pi_s{}^N$ if the cost of effort is $e \le e^*$, and $\pi_s(e) < \pi_s{}^N$ if the cost of effort is $e > e^*$.
We can see that *e** is the threshold effort level. When the effort is $e > e^*$, it is too costly to induce the retailer to retrieve information in equilibrium.

We define $\frac{e}{(\theta-\frac{1}{2})(h-l)}[l + \frac{2\theta-1}{2}(h-l)]$ to be the virtual cost. That is, the cost the supplier will pay to induce the retailer to invest in acquiring information. And we define $\frac{el}{(\theta-\frac{1}{2})(h-l)}$ to be the information rent, which is the benefit the retailer extracts from the channel because of his information advantage.

Bringing equations (20) and (30) into equation (31), we have:

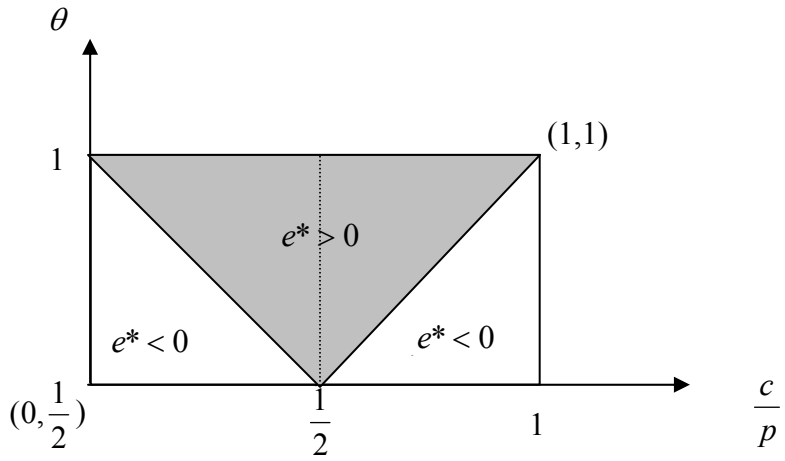
$$e^*(m,\sigma,p,\theta,c)=\begin{cases}\max(0,\dfrac{(p\theta-c)(h-l)}{\dfrac{4l}{(2\theta-1)(h-l)}+2}) & if \quad \dfrac{p}{2}-c<0\\ \max(0,\dfrac{[c-(1-\theta)p](h-l)}{\dfrac{4l}{(2\theta-1)(h-l)}+2}) & if \quad \dfrac{p}{2}-c\geq 0\end{cases} \tag{37}$$

We have

Proposition 6 *The threshold effort level* $e^*(m,\sigma,p,\theta,c)>0$ *if and only if* $\theta p>c>(1-\theta)p$.

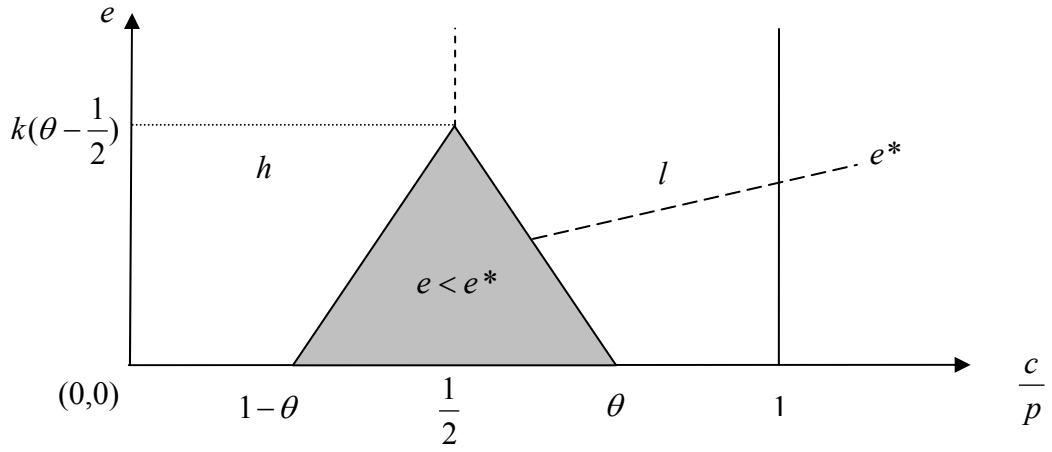
Proof. We can verify this from equation (32) directly.
If $e^*(m,\sigma,p,\theta,c)\leq 0$, it means that the effort is not exerted in equilibrium for any effort level $e>0$.

From Figure 3, we can see that if the parameters fall out of the grey triangle area, in equilibrium the supplier does not induce the retailer to invest in acquiring information, even if the cost of retrieving information is very small.
Figure 3



From Figure 4, we know that if the parameters fall out of the grey area, the supplier does not induce the retailer to invest in acquiring information. The boundary of the grey area is the threshold effort level e^*. In addition, outside the grey area, if $\frac{c}{p}<\frac{1}{2}$, the inventory level in equilibrium is high; if $\frac{c}{p}>\frac{1}{2}$, the inventory level in equilibrium is low. When the parameters are in the grey area, in equilibrium the supplier induces the retailer to invest in acquiring information, and the equilibrium inventory level is high conditional on good news and low conditional on bad news.

Figure 4: If Parameters Fall out the Grey Area, Supplier Doesn't Induce Retailer to Invest in Acquiring Information



Where $k = \dfrac{p(h-l)}{\dfrac{4l}{(2\theta-1)(h-l)}+2}$ in Figure 4.

In addition, we have

Corollary 3 *A necessary condition for the supplier to induce the retailer to invest in acquiring information in equilibrium is* $\theta p > c > (1-\theta)p$.

COMPARATIVE STATIC ANALYSIS

In order to give a more illustrative analysis in our model, we use the following notation:

Denote the mean of the demand as *m*, and the variance of the demand as σ^2. We have

$$m = E(D) = \frac{h+l}{2} \tag{33}$$

and

$$\sigma = \sqrt{\text{var}(D)} = \frac{h-l}{2} \tag{34}$$

So quantity levels *h* and *l* can be characterized by parameters *m* and σ. We have the following equations:

$$h = m + \sigma \tag{35}$$
$$l = m - \sigma \tag{36}$$

The Optimal Contract

We can rewrite equations (27) and (28) as follows:

$$b(m,\sigma,e,p,\theta,c) = p - \frac{2e}{(2\theta-1)\sigma} \tag{37}$$

And

$$w(m,\sigma,e,p,\theta,c) = p - \frac{e}{(2\theta-1)\sigma} \tag{38}$$

We have

Proposition 7 *If $e < e^*$, in equilibrium the optimal contract $\left(w(m,\sigma,e,p,\theta,c), b(m,\sigma,e,p,\theta,c)\right)$ satisfies $b_e<0$, $w_e<0$, $b_\sigma > 0$, $w_\sigma > 0$, $b_\theta > 0$, $w_\theta > 0$, $w_p=b_p=1$* and *$w_m=b_m= w_c=b_c=0$.*

Proof. From Proposition 5, we know that in equilibrium, the optimal contract satisfies equations (37) and (38). Notice that $\theta > \frac{1}{2}$. We can get these results from equations (37) and (38) directly.

When effort is exerted in equilibrium, if the cost of effort increases, the supplier has to compensate for the cost of effort. We know a more generous return policy can help the supplier capture channel profit. When the supplier offers a more generous return policy, she will increase the wholesale price at the same time in order to capture more channel profit. Lowering the wholesale and buy-back prices can offer the retailer more to compensate his cost of effort. The lower buy-back price means less insurance for the retailer, which gives more incentive to invest in acquiring information. So $b_e<0$, $w_e<0$.

When the variance of demand increases, it is more profitable for the retailer to improve his profit by investing in acquiring information. The supplier would like to increase his own profit by increasing the wholesale price and buy-back price, subject that the retailer's (IC) constraint is still held. We have $w_\sigma > 0$ and $b_\theta > 0$.

It is interesting to note that the wholesale price and buy-back price do not depend on the mean of demand. Intuitively, the mean of demand can be considered the determined part of demand. But the optimal buy-back contract will help solve the uncertainty of the problem. In this case, changing the determined part will not change the optimal buy-back contract.

If the information becomes more informative, i.e. if θ increases, it is easier to induce the retailer to acquire the information. The supplier would like to increase his profit by increasing the wholesale price and the buy-back price subject that the retailer's (IC) constraint is still held. So $b_\theta > 0$, $w_\theta > 0$.

The optimal buy-back contract does not depend on production cost. Because here, we use the optimal buy-back contract to stimulate the retailer to retrieve information, therefore the retailer does not care about the cost of production. The cost of production can only help the supplier decide whether to induce the retailer to invest in acquiring information. But the optimal buy-back contract would depend on production cost with a downward slope if p were endogenous.

The Threshold Effort Level

We can rewrite equation (32) as follows:

$$e^*(m,\sigma,p,\theta,c)=\begin{cases}\max(0,\dfrac{(p\theta-c)\sigma}{\dfrac{m-\sigma}{(2\theta-1)\sigma}+1}) & if \quad \dfrac{p}{2}-c<0\\ \max(0,\dfrac{[c-(1-\theta)p]\sigma}{\dfrac{m-\sigma}{(2\theta-1)\sigma}+1}) & if \quad \dfrac{p}{2}-c\geq 0\end{cases} \tag{39}$$

Proposition 8 *If* $\theta p>c>(1-\theta)p$, *the threshold effort level* $e^*(m,\sigma,p,\theta,c)$ *satisfies* $e_m^*<0$, $e_\sigma^*>0$, $e_\theta^*>0$ *and*

$$e^*_p\begin{cases}>0 & if \quad \dfrac{p}{2}-c<0\\ <0 & if \quad \dfrac{p}{2}-c\geq 0\end{cases} \tag{44}$$

$$e^*_c\begin{cases}<0 & if \quad \dfrac{p}{2}-c<0\\ >0 & if \quad \dfrac{p}{2}-c\geq 0\end{cases} \tag{45}$$

Proof. From Proposition 6, if $\theta p>c>(1-\theta)p$, we have $e^*(m,\sigma,p,\theta,c)>0$. We can check equation (39) and obtain the results.

When effort is exerted in equilibrium, the retailer will share the channel profit with the supplier. But when effort is not exerted in equilibrium, the supplier will extract all the profit of the system. When the expectation of demand increases, it is more unlikely that the supplier will offer the optimal contract to elicit the retailer to retrieve information. So $e_m^*<0$.

As the variance of demand increases, more accurate information will aid the performance of the system. And it is easier to elicit the retailer to invest in acquiring information. We have $e_\sigma^*>0$.

The impact of the changes in retail price and in production cost is not so obvious. They depend on the relation between price and cost.

When the information becomes more informative, the performance of the system will increase with more accurate information. It is more likely that the effort level will be exerted. That is, $e_\theta^*>0$.

When θ is close to $\frac{1}{2}$, we can see the threshold level effort goes to infinity. That is,

Corollary 4 *If* $\theta p>c>(1-\theta)p$, *we have* $e^*\to 0$ *when* $\theta\to\frac{1}{2}$.

The Profit of the Retailer

Next, we will see what happens to the profits of the retailer and supplier when some exogenous parameters change.

If $\theta p > c > (1-\theta)p$ and $e<e^*$, in equilibrium the profit of the retailer is as follows:

$$\pi_r = pl + \frac{1}{2}[p\theta + b(1-\theta)](h-l) - \frac{w}{2}(h+l) \tag{42}$$

We can simplify it thus:

$$\pi_r(m,\sigma,e,p,\theta,c) = \frac{(m-\sigma)e}{(2\theta-1)\sigma} \tag{43}$$

We can verify that the profit of the retailer is the information rent, by which the supplier will offer the incentive to induce the retailer to invest in acquiring information.
We have

Proposition 9 *If $\theta p > c > (1-\theta)p$ and $e<e^*$, in equilibrium the profit of the retailer has the following properties:*

$$\frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial e} > 0 \tag{44}$$

$$\frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial m} > 0 \tag{45}$$

$$\frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial \sigma} < 0 \tag{46}$$

$$\frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial \theta} < 0 \tag{47}$$

$$\frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial p} = \frac{\partial \pi_r(m,\sigma,e,p,\theta,c)}{\partial c} = 0 \tag{48}$$

Proof. From Proposition 6, if $\theta p > c > (1-\theta)p$, we have $e^*(m,\sigma,p,\theta,c)>0$. We can derive these results from equation (43).

When effort is exerted in equilibrium, information rent is proportional to the effort level. The retailer shares the channel profit according to the improved demand information with the supplier. When the expectation of demand increases, retailer profit also increases. When the variance of demand increases or the information becomes more informative, it is easier for the supplier to elicit the retailer to invest in acquiring information. Information rent decreases, and retailer profit decreases as well.

It is interesting that information rent is unrelated to retail price. This result would not hold if the retail price p is endogenous.

The optimal buy-back contract is unrelated to the cost of production. Hence the retailer's profit is unrelated to the cost of production.

Profit of the Supplier

We can rewrite equation (30) as follows:

$$\pi_s(m,\sigma,e,p,\theta,c) = (p-c)m - (1-\theta)p\sigma - e\left[\frac{m-\sigma}{(2\theta-1)\sigma}+1\right] \tag{49}$$

In this situation, the virtual cost is $e\left[\frac{m-\sigma}{(2\theta-1)\sigma}+1\right]$ and the information rent can be written as $e\left[\frac{m-\sigma}{(2\theta-1)\sigma}\right]$, which is the profit of the retailer.

Proposition 10 *If $\theta p > c > (1-\theta)p$ and e<e*, in equilibrium the profit of the supplier has the following properties:*

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial e} < 0 \tag{50}$$

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial p} > 0 \tag{51}$$

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial c} < 0 \tag{52}$$

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial \theta} > 0 \tag{53}$$

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial m} > 0 \tag{54}$$

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial \sigma} \begin{cases} > 0 \quad if \quad \dfrac{(1-\theta)(2\theta-1)p\sigma^2}{m\sigma+m-\sigma} < e < e^* \\ < 0 \quad if \quad e < \dfrac{(1-\theta)(2\theta-1)p\sigma^2}{m\sigma+m-\sigma} \end{cases} \tag{55}$$

Proof. From Proposition 6, if $\theta p > c > (1-\theta)p$, we have $e^*(m,\sigma,p,\theta,c)>0$. We can derive those results from equation (49).

When effort is exerted in equilibrium, the supplier need not only compensate the retailer with the cost of acquiring information, but also offer an incentive for the retailer to invest in acquiring information. The information rent is also an increasing function of the cost of effort, which means when the cost of effort increases, the profit of the supplier decreases.

That is,

$$\frac{\partial \pi_s(m,\sigma,e,p,\theta,c)}{\partial e} < 0 .$$

If the retail price increases or production cost decreases, the performance of the system will increase. However the information rent is the same by Proposition 8, and the supplier is better off. By Proposition 8, as the information becomes more informative, the retailer profit or the information rent decreases. However, the performance of the system is better off and supplier profit increases. When the expectation of demand increases, the performance of the system is better off and supplier profit increases at the same time.

When the variance of demand increases, the change in supplier profit is indeterminate: On one hand, the performance of the system is worse off. On the other hand, since the information rent decreases, it is easier for the supplier to elicit the retailer to invest in acquiring information. But when the cost of effort is very small, usually supplier profit decreases.

SOME EXTENSIONS

It is interesting to extend our model in some different directions:

1. Who will retrieve the information when both the supplier and the retailer are able to retrieve it?
2. The model that the retailer's effort can help improve product sales
3. When both firms' effort can help improve product sales, what should the ownership structure be?
4. Demand can be changed with price. That is, demand is *D(p)*, which is a binary discrete distribution dependent on *p*. The prior probabilities are $Prob(D=h(p))=P_h(p)$ and $Prob(D=l(p))=1-Prob(D=h(p))=P_l(p)$. In this situation, the standard vertical model is a special case of our model. There is uncertainty of demand in our model, yet it is still technically tractable.
5. The demand function is continuous.
6. We can consider the quantity-based return policy (quantity flexible contracts).

CONCLUSIONS

The standard buy-back contract model is not consistent with the empirical findings of Kulp (2002) that VMI systems are prevalent when the retailer is better informed than the supplier. We analyze the optimal buy-back contract for a supplier selling to a retailer when demand is uncertain, while the retailer can take a costly unobservable action to forecast demand more accurately. We show when it is costly for the retailer to obtain a better forecast of demand, the first best outcome cannot always be implemented by an optimal buy-back contract. If the retailer invests in acquiring information in equilibrium, the total revenue of the supplier covers not only the cost of investing in acquiring information, but also a positive information rent. Hence, the fact that VMI systems are prevalent can be well explained in our model. In addition, we offer in our model many testable results for which we look forward to having empirical application. Our model is appropriate for analyzing vertical systems when a downstream firm has private information in acquiring more accurate information of uncertain demand. The model is technically tractable while it captures most properties we are interested in, and the explicit solution is available as well.

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BIOGRAPHY AND ACKNOWLEDGEMENT

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ETHICS EDUCATION IN MBA PROGRAMS: EFFECTIVENESS AND EFFECTS

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ABSTRACT

Results of a survey of 3,225 MBA graduates from 75 schools located in the United States are analyzed to determine (a) how and how effectively ethics is incorporated in the graduate business curriculum, (b) how graduates assessed the corporate scandals that occurred prior to the study,; and (c) how these scandals affected their job search behavior. Forty-two percent of graduates say that ethics is being incorporated extremely or very effectively in the curriculum, but 18% say incorporation is not effective. The effectiveness of ethics education is most influenced by the number of ways that ethics is incorporated in the curriculum, based on the results of a multiple regression analysis. The inclusion of a required core course, integrated case studies within most courses, and a reference to ethics in most courses also contribute positively to predicting effectiveness. So, too, do ratings of the quality of program management, curriculum, and faculty, as well as students' willingness to recommend their schools.

KEYWORDS: Business Ethics, Business Education, MBA Programs

JEL: M1

INTRODUCTION

When Enron Corp.'s corporate misconduct became apparent in late 2001, and Arthur Andersen met its demise in 2002, many graduate business schools reexamined their commitment to integrate ethics education into their curriculum and initiated reforms (e.g., Griffin, 2002; Browning, 2002; Gottlieb, 2002; Schmalensee, 2003; Alsop, 2003; Lewis, 2003; Weisman, 2003). While this reexamination was under way, students in the MBA class of 2003 were pursuing and/or completing their degrees. These students are the subject of the research reported here. The research was designed to determine (a) how and how effectively ethics is incorporated in the graduate business curriculum; (b) how graduates assessed the corporate scandals that occurred prior to the study; (c) how these scandals affected their job search behavior; and (d) whether individual respondent and school characteristics can contribute to understanding the results of the study.

Although there are copious amounts of research on the effects of ethics education, a limitation is that the data can rarely be generalized to the graduate business school community. The research is usually institution-specific and focused on undergraduate students (e.g., Lowery, 2003; Weber & Glyptis, 2000; Gautschi & Jones, 1998; Peppas & Diskin, 2001; Abdolmohammadi & Reeves, 2000; Arlow & Ulrich, 1988; Earley & Kelly, 2004). This paper seeks to broaden the research base by focusing specifically on graduate business students enrolled in a diverse set of institutions.

The paper begins with a review of the literature on ethics education in business. This is followed by a discussion of research methodology—sample selection, sample characteristics, and questionnaire design. Then, results are presented on how ethics is incorporated in the curriculum, as well as the effectiveness of incorporation. Regression analysis is used to identify predictors of effectiveness and their relative importance. Respondent attitudes toward corporate scandals occurring prior to the study are also discussed, as well as attitudes about the effects of these scandals on business and on post-MBA job searches.

LITERATURE REVIEW

A number of studies indicate that there may be a relationship between age and ethics (e.g., Lowry, 2003; Borkowski & Ugras, 1998; Ruegger & King, 2004; Rest 1986). Borkowski (1998) conducted a meta-analysis of empirical studies from 1985 through 1994 and analyzed the relationship of age to the ethical attitudes and behavior of business students. Of the 35 studies in the meta-analysis, Borkowski found 19 with no significant relationship, one mixed study did not report findings, and 13 found that older students responded more ethically, while two studies found the opposite. Considering that the National Center for Education Statistics reported in 2000 that the average age of graduate business students was 33 and the average age of undergraduate students was 21, it seems imperative that additional research be conducted at the graduate level.

The authors uncovered a few studies that included graduate business students and measured the effects of ethics education (Glenn, 1992; Stead & Miller, 1988; Power & Lundsten, 2001; Peppas, 2003). Both Glenn (1992) and Stead and Miller (1988) administered surveys before and after a "Business and Society" course to measure change in ethical values. Peppas (2003) studied graduate business students' attitudes about business codes of ethics and the influence that reports of corporate misconduct had on their students' responses. The Peppas study found that neither taking a course in ethics nor reports of corporate misconduct significantly affected attitudes toward implementation of an ethics code. A limitation of the Peppas study and other research like it is the studies rely on responses to hypothetical scenarios to measure changes in ethical awareness, ethical values, or ethical reasoning after students have taken one course.

There is evidence that the greater the exposure to ethics education, the greater the impact on ethical reasoning and decision-making (Luther, DiBattista & Gautschi, 1997; Rest, 1986). Luther, DeBattista, and Gautschi (1997) found that students exposed to integrative ethical education had more positive attitudes toward the current ethical climate, as well as toward what the climate should be. Rest (1986) noted that "one of the strongest and most consistent correlates of development in moral judgment has been years of formal education" (as cited in Richards, Gilbert, & Harris, 2002).

There is also evidence that student perception of the quality of instruction and curriculum is related to the effectiveness of ethics education (Power & Lundsten, 2001). Power and Lundsten (2001) studied the effects of their school's integrated ethics curriculum and included student feedback in their assessment. Results of their study indicated that higher perceived class quality is a factor in producing higher values on ethical questions. These results suggest there is a need for additional research that looks across the various ways ethics is incorporated into the curriculum and the differing degrees to which students are exposed to ethics education to truly understand the effects of ethics education. Moreover, because "class quality" can differ even among similar methods, a quality evaluation of ethics incorporation should be included.

Studies indicate that students in general are concerned about the state of business ethics and support the teaching of ethics (e.g., Beltramini, Peterson, & Kozmetsky, 1984, 1991; Crane, 2004; Power & Lundsten, 2001) but that they express doubt that they can have an impact on improving business ethics. Crane (2004) found that though 80% of the students surveyed believed that it is possible to improve ethics in business, only 35% believed that business ethics will improve in the future.

There is some evidence that moral development may affect the work climate a person prefers (Sims & Keon, 1997; Scott, 2000). Scott (2000) surveyed graduate business school students and found that the values of a company and the fit of those values with the students' values are important to students' decisions about whether to interview with that company. Were ethics teachings effective in developing

moral reasoning, one could argue that students would seek employers that display positive business ethics.

Research to date to determine the effectiveness of ethics education is extensive. But, as noted earlier, much of it focuses on undergraduate students, is institutionally specific, and is based on hypotheticals. In addition, conclusions are often based on small sample sizes. The present study seeks to overcome these limitations with data and analysis based on a large sample of respondents enrolled in a diverse set of institutions and MBA programs. And although before-after measurements based on hypotheticals can yield convincing evidence of cause and effect, they are generally less able to produce information on real attitudes and behavior—the objective in this study—than are direct questions.

METHODOLOGY

Data for this study are from an ongoing research project, the Global MBA® Graduate Survey of graduating MBA students, funded by the Graduate Management Admission Council® (GMAC®), sponsors of the Graduate Management Admission Test® (GMAT®) business school entrance exam. The survey is conducted annually over the Internet. Online questionnaire administration offers several advantages over a paper-and-pencil administration. First, the online survey is programmed to check for the accurate completion of each question before the respondent is allowed to proceed to the next question; this method eliminates the typical problems associated with item nonresponse. Second, for multiple-response questions likely to be affected by order bias, response categories are randomized before the questionnaire is displayed on the respondent's monitor. Third, a geographically diverse sample can be reached in a timely and cost-effective manner. Fourth, skip patterns allow respondents to move quickly and appropriately through the questionnaire because they never see questions that they should not be asked (e.g., race/ethnicity questions for non-U.S. citizens).

Sample Selection

In order to develop the sample for the survey, GMAT-using schools accredited by the Association to Advance Collegiate Schools of Business International (AACSB) were invited to participate by providing e-mail addresses of graduating MBA students. To encourage schools to participate, they were offered confidential access to data on responses from their students that could be benchmarked against results for the overall sample. Ninety-five schools from 10 different countries ultimately participated, including schools from many regions of the United States.

Potential respondents received an invitation via e-mail with an embedded unique identifier in the link to the Web-based survey. The questionnaire was available at the online survey site from February 12, 2003, though March 12, 2003. Two weeks into this time period, nonrespondents and those whose responses were incomplete received a follow-up e-mail message. When the survey closed, 4,216 students had logged in to the site and completed the questionnaire. Based on 15,676 e-mail addresses determined to be valid, the response rate to the survey was 27%.

Because the corporate scandal questions are U.S.-centric, students attending schools outside the United States were removed from the sample for this study. This reduction left a final sample size of 3,225 respondents representing 75 U.S. graduate business schools (see Appendix A for a complete list of participating schools).

Sample Characteristics

The following table shows the characteristics of individuals and schools in the sample. In the table, *school size* refers to the size of the graduating class. School prestige was measured using published rankings of

MBA programs. Although these rankings are controversial, they offer a convenient, standardized, and low-cost way to create a measure of school prestige that possesses some face validity. Rankings from three publications—*Financial Times*, *U.S. News & World Report*, and *Business Week*—were used to classify 25 U.S. business schools as "top-ranked." Fifteen of the top-ranked schools are included in the present study, representing 20% of the 75 participating schools and contributing 44% of the survey respondents.

As Table 1 shows, the sample is diverse in terms of both individual and school characteristics. It would have been desirable to obtain larger sample sizes from executive MBA programs and from Canadian citizens attending U.S. schools. But even in these cases, sample sizes are sufficient for statistical tests used in the analysis.

Table 1: School, Program, and Individual Characteristics of the Survey Sample

Characteristics	Number	Percent
Gender		
Male	2,174	67%
Female	1,051	33%
Total	3,225	100%
Age		
27 and younger	1,026	32%
28–34	1,824	57%
35 and older	375	12%
Total	3,225	100%
Mean	3, 225	29.8
Median	3, 225	29
Citizenship (World Regions)		
Asia	498	16%
United States	2,202	70%
Canada	38	1%
Latin America & the Caribbean	226	7%
Europe	161	5%
Total	3,125	100%
Race/Ethnicity		
White (non-Hispanic)	1,648	80%
All Others (U.S.)	409	20%
Total	2,057	100%
Program Type		
Full-time	2,596	82%
Part-time	489	15%
Executive	84	3%
Total	3,169	100%
School Size		
Small (Less than 100)	768	24%
Medium (100 to 250)	1,075	33%
Large (251 or more)	1,382	43%
Total	3,225	100%
School Prestige		
Top-ranked	1,424	44%
All others	1,801	56%
Total	3,225	100%

Questionnaire Design

Background for the survey design was provided by (1) prior GMAC® research on matriculants in MBA programs; (2) prior GMAC® experience in surveying the graduate business school student audience with the Global MBA® Graduate Surveys of 2000, 2001, and 2002, as well as with other surveys; and (3) ongoing input from participating schools on their information needs.

The primary objective of the survey is to provide continuing information to faculty and to MBA program administrators. To guard against potential problems stemming from the sensitive nature of questions about ethics and ethics education and the possibility of demand effects, survey participants received questions on ethics only after answering a series of core questions, most of which had been asked in previous years and without any resulting difficulty. These core questions covered the following topics, in the order shown:

- students' satisfaction with 10 potential benefits of the MBA;
- how the MBA may increase career options;
- the influence of a variety of communication sources on the selection of the schools respondents attend;
- the importance of 17 school selection criteria;
- respondents' satisfaction with different aspects of their MBA program;
- likelihood of respondents' recommending their school to someone deciding whether to pursue an MBA;
- the overall value of the MBA; and
- the amount of respondents' self-reported improvement in 12 skills and abilities.

The questions on ethics covered these topics:

- the ways ethics is incorporated in the graduate business curriculum;
- the effectiveness of the incorporation of ethics in the curriculum;
- an assessment of the significance of recent corporate scandals;
- attitudes toward the effects of recent corporate scandals on business; and
- the effects of corporate scandals on job search.

Findings are reported in the order in which questions were asked, along with additional analyses as appropriate. These additional analyses include (1) analyses of relationships among survey variables; and (2) analyses of relationships between survey variables and sample characteristics reported in Table 1.

RESULTS

Incorporation of Ethics in the Curriculum

Each respondent was presented with a list of eight ways ethics could be incorporated into a graduate business curriculum and asked to select the ways that applied to his or her own school. As discussed in the Method section, because this is a multiple-response question, the eight ways were randomized when displayed on the respondents' computer screens to control for order bias. Results are shown in Table 2.

As Table 2 displays, ethics is incorporated most often (56%) using speakers, followed by required core courses (46%), and integrated case studies within some courses (44%). Two other ways—a reference to ethics in most courses and in elective courses—were selected by two fifths of the respondents. Slightly

more than one fourth (26%) said that ethics was incorporated through workshops. And nearly one fifth reported integrated case studies within most courses (18%) or outside assignments/projects (17%).

Table 2: Methods Used to Incorporate Ethics

Method	**Percent Responding Method Used (n = 3,225)**
Speakers	56%
Required core course(s)	46%
Integrated case studies within some courses	44%
Referred to in most courses	40%
Elective course(s)	40%
Workshops	26%
Integrated case studies within most courses	18%
Outside Assignments/Projects	17%

The earlier discussion of sample characteristics detailed differences among respondents with regard to the type of MBA program in which they were enrolled, the sizes of schools, and school prestige. Cross-classification of these school characteristics with the ways in which ethics is incorporated in the curriculum reveals important insights into the current status of ethics education. Results are shown in Tables 3, 4, and 5.

Table 3: School Differences in Ways of Incorporation, by Program Type

			Program Type			
Ways of Incorporation		**Total**	**Full-time**	**Part-time**	**Executive**	p (χ^2)
	n	3,225	2,596	489	84	
Speakers	%	55.9%	62.1%	28.0%	44.0%	< .001
Required core course(s)	%	46.2%	48.3%	39.9%	26.2%	< .001
Integrated case studies within some courses	%	44.5%	44.4%	43.8%	53.6%	NS
Referred to in most courses	%	40.5%	39.8%	43.4%	44.0%	NS
Elective course(s)	%	39.7%	43.1%	28.8%	9.5%	< .001
Workshops	%	26.3%	29.0%	14.9%	14.3%	< .001
Integrated case studies within most courses	%	18.1%	18.0%	17.4%	28.6%	< .05
Outside Assignments/Projects	%	17.4%	18.1%	12.9%	21.4%	< .05

Table 4: School Differences in Ways of Incorporation, by School Size

			School Size			
Ways of Incorporation		**Total**	**Small**	**Medium**	**Large**	p (χ^2)
	n	3,225	768	1,075	1,382	
Speakers	%	55.9%	50.3%	49.7%	63.9%	< .001
Required core course(s)	%	46.2%	42.7%	50.9%	44.5%	< .001
Integrated case studies within some courses	%	44.5%	47.4%	42.8%	44.1%	NS
Referred to in most courses	%	40.5%	45.8%	41.3%	36.9%	< .001
Elective course(s)	%	39.7%	29.2%	35.5%	48.7%	< .001
Workshops	%	26.3%	19.1%	21.2%	34.2%	< .001
Integrated case studies within most courses	%	18.1%	23.2%	19.0%	14.7%	< .001
Outside Assignments/Projects	%	17.4%	20.7%	16.3%	16.5%	< .05

Table 5: School Differences in Ways of Incorporation, by School Prestige

			School Prestige		
Ways of Incorporation		**Total**	**Top-Ranked**	**All Others**	p (χ^2)
	n	3,225	1,424	1,801	
Speakers	%	55.9%	68.0%	46.3%	< .001
Required core course(s)	%	46.2%	46.0%	46.4%	NS
Integrated case studies within some courses	%	44.5%	43.8%	45.0%	NS
Referred to in most courses	%	40.5%	38.2%	42.3%	< .05
Elective course(s)	%	39.7%	53.8%	28.5%	< .001
Workshops	%	26.3%	36.3%	18.4%	< .001
Integrated case studies within most courses	%	18.1%	14.5%	21.0%	< .001
Outside Assignments/Projects	%	17.4%	16.6%	18.0%	NS

For each of the ways that ethics is incorporated, chi-square analysis of the statistical significance of differences shows the following:

- Speakers. Use of speakers to incorporate ethics into the curriculum (the most popular way overall) varies significantly by all three school characteristics. Differences are the widest for type of MBA program. More than three fifths of respondents in full-time programs (62%) reported the use of speakers, compared with 28% of those in part-time programs. Executive programs fall in between, at 44%. Respondents attending large schools reported the use of speakers significantly more than those in small and medium-sized schools. And respondents from top-ranked schools reported the use of speakers more than those in other U.S. schools.
- Required core courses. Again, program type influences use of this method of ethics incorporation more than do other school characteristics. A larger share of respondents in full-time programs than part-time programs—and in part-time programs than in executive programs—reported that their schools have required core courses. Respondents in medium-sized schools said that core courses in ethics are required significantly more often than did those in small and large schools. There are no significant differences related to school prestige.
- Integrated case studies within some courses. This method of ethics incorporation is not significantly affected by the three school characteristics.
- Referred to in most courses. Program type does not significantly affect whether ethics is referred to in most courses, but school size and school prestige do. The smaller the school, the more likely respondents were to say ethics is referred to in most courses. Respondents in other U.S. schools also were more likely to report this method of ethics incorporation than were those in top-ranked schools.
- Elective courses. All three school characteristics significantly affect the presence of elective courses. With regard to program type, respondents in full-time programs reported elective courses at more than four times the rate of those in executive programs (43%, compared with 10%); part-time programs are in between at 29%. Where school size is concerned, the larger the school, the more likely respondents were to report elective courses. And respondents in top-ranked schools were nearly twice as likely to report elective courses as those in other U.S. schools were (54%, compared with 29%).
- Workshops. Respondents in full-time programs reported ethics incorporation through workshops significantly more than those in part-time and executive programs did. Those in large schools reported the use of workshops significantly more than those in small and medium schools did. And those in top-ranked schools reported the use of workshops at twice the rate of those in other U.S. schools (36%, compared with 18%).

- Integrated case studies within most courses. This method of incorporation also varies significantly by all three school characteristics. Those in executive programs reported integrated case studies within most courses significantly more than did those in full-time and part-time programs. Regarding school size, the smaller the school, the more likely respondents were to report integrated case studies within most courses. Those in other U.S. schools were more likely to report this type of ethics incorporation than were those in top-ranked schools.
- Outside assignments/projects. Respondents in executive programs reported outside assignments/projects the most and those in part-time programs, the least (with full-time programs in between). Those in small schools reported the use of outside assignments/projects significantly more than those in medium and large schools did. School prestige does not significantly affect the usage of outside assignments/projects.

Some differences related to program type, school size, and school prestige are striking. But the importance of these differences can only be known when the effectiveness of ethics integration is examined—the topic to which this paper now turns.

Effectiveness of Ethics Incorporation

After respondents indicated the ways in which ethics is incorporated into the graduate business curriculum, respondents were asked, "How effectively is ethics incorporated into your graduate business curriculum?" They responded along a five-point scale with these descriptors: *extremely effectively (5), very effectively (4), somewhat effectively (3), not very effectively (2),* and *not at all effectively (1).* Results are shown in Table 6.

Table 6: Respondents' Ratings of Effectiveness of Ethics Incorporation

Rating	**Percent (n = 3,225)**
Extremely effectively	10%
Very effectively	32%
Somewhat effectively	41%
Not very effectively	14%
Not at all effectively	4%
Total	100%

Attitudes about the effectiveness of ethics incorporation in the curriculum appear mixed. Forty-two percent of respondents said ethics is incorporated either extremely or very effectively, but only about one fourth of these chose the extremely effective point on the scale. And 41% had enough reservations about effectiveness to reduce their evaluation to somewhat effectively. On the other hand, only 20% said ethics is incorporated not very or not at all effectively. Overall, it appears that respondents rated the incorporation of ethics as effective—with reservations (mean effectiveness = 3.29). This conclusion is further supported by responses at extreme scale positions for other survey items also measured on 5-point scales: 44% who are "extremely satisfied" with the opportunity the MBA program gave them to improve personally; 50% who said their abilities to think strategically improved "a great deal"; 37% who said school location was an "extremely important" school selection criteria; and 61% who would "definitely" recommend their schools to someone considering pursuing an MBA. Clearly, respondents are able to respond at extreme scale positions.

Ways Ethics Is Incorporated and Effectiveness

In order to assess the effectiveness of each way ethics is incorporated, the authors calculated mean effectiveness ratings for respondents who reported the use of a given method of ethics incorporation and then compared those ratings to the ratings of respondents who did not report use of the given method.

Differences between the two groups were significant ($p < .001$) for all eight methods. Table 7 shows results ranked in terms of the size of the differences between usage and nonusage.

As the table shows, the widest difference in mean effectiveness between usage and nonusage is for integrated case studies within most courses. Two other ways of incorporation—outside assignments/projects and a reference in most courses—are about equal in difference between usage and nonusage. Interestingly, the difference for required core course(s) is about one half that for integrated case studies within most courses. Elective courses showed the least difference between usage and nonusage.

Table 7: Comparison of Mean Effectiveness Rating Based on Usage of Method

Method	**Mean Effectiveness Rating**		**Difference[a]**
	Used	**Not Used**	
Integrated case studies within most courses	3.97	3.14	0.82
Outside assignments/projects	3.81	3.18	0.63
Referred to in most courses	3.65	3.05	0.59
Speakers	3.50	3.03	0.48
Workshops	3.63	3.17	0.46
Required core course(s)	3.54	3.08	0.45
Integrated cases studies within some courses	3.46	3.16	0.30
Elective courses	3.45	3.19	0.26

[a] $p < .001$ for all differences.

Because respondents could select multiple ways used to incorporate ethics in the curriculum, it is relevant to ask how many ways were selected. Although the ways ethics is incorporated are qualitatively quite different in their likely impact, it seems reasonable to suggest that the total number of methods used is a proxy for the exposure a graduate receives to education in ethics. Therefore, the authors calculated the total number of ways selected; results are shown in Table 8.

Table 8: Number of Incorporation Methods Used in Program

Number Used	**Percent (n = 3,225)**
0	3%
1	20%
2	21%
3	23%
4	16%
5	9%
6	5%
7	2%
8	1%
Total	100%

In calculating the number of methods used, we included other responses given by respondents, as well as the eight pre-specified ways of incorporation.

Only 3% of respondents indicated that ethics was not incorporated at all in the curriculum. Twenty percent indicated only one way of incorporation, but slightly higher percentages indicated two or three ways of incorporation. One third indicated four or more ways. The mean number of mehtods of incorporation is 2.9.

If the number of ways ethics is incorporated into the curriculum is a good proxy for the ethics education received by respondents, a positive correlation between effectiveness ratings and the number of ways ethics is incorporated should be expected. In fact, there is a moderate positive relationship between exposure (as measured by the number of ways of incorporation) and ratings of the effectiveness of incorporation; the Pearson correlation coefficient is .50 ($p < .001$).

As discussed earlier, prior research supports a relationship between the quality of instruction and curriculum and the effectiveness of ethics education (Power & Lundsten, 2001). Prior research also supports a relationship between exposure to ethics education and ethical reasoning and decision-making. Also, older students have been found (in some studies) to respond more ethically. Which of these predict evaluations of the effectiveness of ethics education among MBA students? And what is the predictive power of other respondent characteristics (beyond age), as well as school and program characteristics? We use dummy variable, multiple regression analysis (backward elimination) to answer these questions.

The effectiveness of ethics incorporation was specified as the dependent variable in the regression analysis with the following as independent variables:

- Measures of the quality of the students' educational experience. Students rated the quality of three aspects of their programs (program management, curriculum, and faculty) by answering this question: "Based on your entire educational experience as a graduate business school student, please rate each of the following aspects of your program." They rated each aspect on a five-point Likert-type scale: *outstanding (5), excellent (4), good (3), fair (2),* or *poor (1)*. In addition, students indicated their willingness to recommend their schools, used here as an overall measure of school/program quality. They were asked: "Would you recommend your school to someone who has decided to pursue an MBA?" Respondents selected from the following possibilities: *definitely yes (5), probably yes (4), probably no (2), definitely no (1),* or *uncertain (3)*.
- Measures of exposure: eight pre-specified methods by which ethics is incorporated in the curriculum (discussed earlier and shown in Table 2) and the number of ways ethics is incorporated in the curriculum; and
- Dummy variables for demographic characteristics (gender, age, citizenship, race/ethnicity) and school characteristics (program type, school size, and school prestige).

The model produced from the analysis includes eight variables, and the multiple R is a moderately strong .62. The independent variables included in the model are shown in Table 9, along with their standardized beta coefficients.

Table 9: Variables Included in Multiple Regression Model Predicting Effectiveness Rating

Independent Variable	**Standardized Beta Coefficient**
Number of incorporation methods used	0.260*
Required core course(s)	0.152*
Quality of program management	0.149*
Integrated case studies within most courses	0.145*
Referred to in most courses	0.120*
Willingness to recommend school	0.081*
Quality of curriculum	0.075**
Quality of faculty	0.062***

** p < .001; ** p < .01; *** p < .02.*

As shown in Table 9, the most powerful variable in the model is the number of ways in which ethics is incorporated in the curriculum. Three other variables that also make independent contributions to the prediction of effectiveness relate to specific ways that ethics is incorporated in the curriculum: required core courses, integrated case studies within most courses, and referred to in most courses. Respondent evaluations of the quality of program management enters the model with slightly greater impact than two of the specific ways in which ethics is incorporated in the curriculum. The willingness of students to recommend their schools, as well as ratings of the quality of curriculum and faculty, also make unique contributions to predicting effectiveness, but with notably less impact than other variables in the model. School prestige does not predict effectiveness, nor does the size of the MBA program or the type of MBA

program (full-time, part-time, or executive). Age and other specific ways in which ethics is incorporated in the curriculum do not enter the model.

The model clearly shows the powerful impact of exposure to ethics education on assessments of effectiveness—expressed both in the extent of exposure and, independently, in the inclusion of required core courses in the curriculum, the use of integrated case studies, and the reinforcement that would result from repeated reference in courses. While regression analysis can only suggest causation and not prove it, the suggestion is both plausible and strong for these predictors. Regarding ratings of the quality of aspects of the MBA program—program management, curriculum, and faculty—and the willingness of students to recommend their schools, the examination of suggested causality raises an important question: Is it more likely that the quality of these aspects of the school/program are affecting ethics education effectiveness or that effectiveness is affecting evaluations of school/program quality and students' willingness to recommend their schools? Indeed, the bivariate Pearson correlation coefficients between ethics education effectiveness and these predictors are not trivial: program management, .37; curriculum, .36; faculty, .33; and school recommendation, .33. If the effectiveness of the incorporation of ethics in the curriculum leads to higher ratings of program management, curriculum, and faculty, as well as an increased willingness to recommend the school, there are at least three important implications. First, MBA program directors and faculty should know that education effectiveness could be a determinant of how they are being evaluated. Second, curriculum planning committees should realize that students likely have expectations about receiving ethics education and that their evaluations of the effectiveness with which it is provided affects their ratings of curriculum quality. Finally, if ethics education effectiveness enhances the willingness of students to recommend their schools, it is imperative that steps are taken to maintain and/or improve it. Current students and alumni are a major source of influence on the decisions of prospective students (Schoenfeld & Bruce, 2004).

Because repeated exposure to ethics education is so important in the model, it is important to examine how exposure varies by school characteristics—program type, school size, and school prestige—not because these school characteristics contribute directly to the prediction of effectiveness (which the regression analysis shows is not the case), but because of the implications this may have for curriculum planning. Results are shown in Table 10.

Table 10: Mean Number of Ways of Incorporation by School Characteristics

School Characteristics	Number	Mean[a]
Program Type		
Full-time	2,596	3.1
Part-time	489	2.3
Executive	84	2.5
School Size		
Small (Less than 100)	768	2.8
Medium (100 to 250)	1,075	2.8
Large (251 or more)	1,382	3.1
School Prestige		
Top-ranked	1,424	3.2
All others	1,801	2.7

[a]Overall mean = 2.9.

One-way ANOVA analyses with post hoc Bonferroni tests show that the extent of ethics education exposure in—

- full-time programs significantly exceeds that of part-time and executive programs;
- large schools significantly exceeds that of small and medium-sized schools; and
- top-ranked schools significantly exceeds that of other U.S. schools.

When combined with findings from the regression analysis, the implications of the aforementioned differences are as follows: First, faculty and administrators in part-time and executive programs, in small and medium-sized schools, and in schools that are not top ranked should seek to expand the number of ways in which ethics is incorporated in the curriculum. Second, because the model also shows the power of integrated case studies within most courses, required core courses, and a reference to ethics in most courses, faculty and administrators should conduct curriculum reviews with this finding in mind—regardless of school characteristics. Individual courses should be reviewed to determine whether they include integrated case studies on ethics, and the addition of a required core course should be considered when one is not already offered. Finally, schools that are not top ranked may benefit from studying the activities of more prestigious schools when doing their curriculum reviews.

Attitudes toward Recent Corporate Scandals

In order to evaluate graduate business students' opinions of the state of business ethics, respondents were asked the following question: "Which of the following best describes your assessment of recent corporate scandals? These scandals are…" Sixty-eight percent believed the recent scandals were more significant than those experienced in the past; 29% believed the scandals were no different from those experienced in the past; and 3% believed scandals were less significant than those experienced in the past.

The analysis of subgroup differences in the assessment of recent corporate scandals shows significant differences across all four individual characteristics (Table 11). This is due, in part, to the sensitivity of chi-square analysis to large sample sizes. Nevertheless, these differences are revealing.

Table 11: Sub-group Differences in Assessment of Recent Corporate Scandals

	N	More Significant	No Different	Less Significant	Total
All	3,225	68%	29%	3%	100%
Gender[a]					
Male	2,174	66%	31%	3%	100%
Female	1,051	73%	25%	3%	100%
Age[b]					
27 and younger	1,026	68%	29%	3%	100%
28-34	1,824	66%	30%	3%	100%
35 and older	375	75%	23%	2%	100%
Citizenship[c]					
Asia	498	58%	28%	14%	100%
Canada	38	74%	26%	0%	100%
Europe	161	73%	25%	1%	100%
Latin America	226	81%	18%	1%	100%
United States	2,202	68%	31%	1%	100%
Race/Ethnicity[d]					
White (non-Hispanic)	1,648	68%	32%	0%	100%
All Others	409	71%	27%	2%	100%

[a] *Chi-square = 15.4, df = 2, p < .001.*
[b] *Chi-square = 10.7, df = 4, p < .05.*
[c] *Chi-square = 259.9, df = 8, p < .001.*
[d] *Chi-square = 16.7, df = 2, p < .001.*

Results revealed in Table 11 show the following:

- Females were more likely than males to assess the recent scandals as more significant than those in the past.
- Respondents 35 and older, compared to those younger than 35, assessed the recent scandals as more significant than those in the past.
- Citizens of Latin America assess the recent scandals as more significant than those in the past more so than citizens from any other world region do (81%); and those from Asia, the least (58%).
- Minorities are slightly more likely than non-Hispanic whites to regard the recent scandals as more significant.

The findings with regard to age are consistent with those from a number of other studies discussed earlier.

Effects of Corporate Scandals

Respondents were presented with a list of eight possible effects of the recent corporate scandals on business. They were then asked to select the ones they believed had occurred (randomized multiple-response items). Table 12 shows results ranked in terms of the percentage indicating an effect. More than four fifths (81%) believed that the scandals created an atmosphere of distrust of corporations. A substantially lower percentage believed that the scandals had positive effects: 52% said the scandals promoted short- and long-term change in business practices; 41% said the scandals caused companies to act more openly; and slightly less than two fifths (37%) said the scandals caused companies to act more ethically. Less than one third selected other possible effects.

Table 12: Effects of Recent Corporate Scandals

Effect	Percent Choosing Effect (n = 3,225)
Created an atmosphere of distrust of corporations	81%
Promoted short- and long-term change in business practices	52%
Caused companies to act more openly	41%
Caused companies to act more ethically	37%
Negatively impacted the perceptions by the marketplace of MBAs	30%
Brought about short-term change, but will not change long-term business practices	29%
Had little or no effect on business practices	8%
Elevated the respectability of an MBA education	4%

The authors used Pearson correlation coefficients to explore the relationship between perceived effects of recent corporate scandals and the effectiveness of ethics incorporation in the curriculum. The 5-point scale used to measure effectiveness is assumed to be an interval scale. Correlation coefficients and significance levels are shown in Table 13. Correlation coefficients for all of the effects are weak.

The more effective the incorporation of ethics in the curriculum, the more likely respondents were to say the recent corporate scandals—

- caused companies to act more ethically;
- promoted short- and long-term change in business practices;
- elevated the respectability of an MBA education; and/or
- caused companies to act more openly.

The more effective the incorporation of ethics in the curriculum, the less likely respondents were to say the recent corporate scandals—

- brought about short-term change, but will not change long-term business practices;
- had little or no effect on business practices; and/or
- negatively affected the perceptions by the marketplace of MBAs.

Table 13: Correlations of Effects of Scandals with Ethics Incorporation Rating

Effect	**Pearson Correlation (*n* = 3,225)**
Caused companies to act more ethically	0.16*
Brought about short-term change, but will not change long-term business practices	-0.15*
Promoted short- and long-term change in business practices	0.12*
Elevated the respectability of an MBA education	0.10*
Caused companies to act more openly	0.10*
Had little or no effect on business practices	-0.08*
Negatively impacted the perceptions by the marketplace of MBAs	-0.04*
Created an atmosphere of distrust of corporations	-0.02

* $p < .001$

Although the correlation coefficients are suggestive, they may mask effects at the extreme points on the ethics education effectiveness scale. Therefore, responses to the effectiveness question were cross-classified with perceived effects of the recent corporate scandals to further explore the nature of the relationship between the two. Results are shown in Table 14; the potential effects are listed in descending order in terms of the strength of the underlying correlation coefficient.

Table 14: Percent Choosing Effect of Scandals Based on Ethics Incorporation Rating

Effect	**Total (n = 3,225)**	**Extremely Effectively (n = 310)**	**Very Effectively (n = 1,025)**	**Somewhat Effectively (n = 1,316)**	**Not very Effectively (n = 449)**	**Not at all Effectively (n = 125)**
Caused companies to act more ethically*	37%	49%	45%	34%	28%	20%
Brought about short-term change, but will not change long-term business practices*	29%	23%	22%	31%	40%	46%
Promoted short- and long-term change in business practices*	52%	57%	60%	51%	41%	36%
Elevated the respectability of an MBA education*	4%	10%	5%	3%	1%	2%
Caused companies to act more openly*	41%	49%	45%	34%	28%	20%
Had little or no effect on business practices*	8%	7%	5%	8%	11%	14%
Negatively impacted the perceptions by the marketplace of MBAs	30%	27%	28%	31%	33%	34%
Created an atmosphere of distrust of corporations	81%	76%	80%	82%	83%	74%

* p (χ^2) < .001

As the table shows, respondents who rated the effectiveness of the incorporation of ethics in the curriculum as extremely effective are nearly two and one-half times as likely as those who rated incorporation as not at all effective to say that the recent corporate scandals have caused companies to act more ethically. And those who rated incorporation as not at all effective are twice as likely as those who rated it extremely effective to say that recent corporate scandals have brought about short-term change but

will not change long-term business practices. For both of these items, however, almost the same can be said in a comparison between not at all effective and very effective.

Many respondents in MBA programs are fully employed while attending school and intend to remain with their employers upon graduation. Others are actively searching for jobs. In the sample of respondents in this study, 72% were searching for jobs at the time of the study. These respondents were asked to select all that applied from a list of four effects corporate scandals "over the last few years" have had on their job search (randomized multiple-response items). Results are shown in Table 15.

Table 15: Effects of Corporate Scandals on Job Search Behavior

Effect	**Percent Choosing Effect (n=2,314)**
I'm more likely to accept a job offer from a reputable company versus one under investigation	64%
I think more critically about the ethical culture of prospective employers	52%
I'm more likely to ask questions about company values in job interviews	39%
I spend more time closely reading corporate financial statements	24%

In order to explore the relationship between the effectiveness of ethics incorporation in the curriculum and the effects of corporate scandals on job search behavior, the authors used Pearson correlation coefficients (again, with the assumption that the 5-point scale used to measure effectiveness is an interval scale). Correlation coefficients and significance levels are shown in Table 16.

Table 16: Correlations of Effects on Job Search Behavior with Ethics Incorporation Rating

Effect	**Pearson Correlation (n = 2,314)**
I think more critically about the ethical culture of prospective employers	0.13*
I spend more time closely reading corporate financial statements	0.11*
I'm more likely to accept a job offer from a reputable company versus one under investigation	0.09*
I'm more likely to ask questions about company values in job interviews	0.07*

* $p < .001$.

The correlation coefficients indicate that the effectiveness of ethics education is weakly related to the effects of recent corporate scandals on job search behavior. Again, though, these correlation coefficients may mask effects at the extreme points on the ethics education-effectiveness scale, and a cross-classification of effects on job search behavior with responses on the ethics-effectiveness scale may produce additional insight. Table 17 reports the results of this cross-classification.

Table 17 shows that respondents who rated the effectiveness of the incorporation of ethics into the curriculum as extremely effective are more than twice as likely as those who rated incorporation as not at all effective to say they think more critically about the ethical culture of prospective employers and that they spend more time closely reading financial statements. For the other two possible effects on job search behavior, those in the extremely effective group are about one and one-half times as likely as those in the not at all effective group to indicate the stated effect on job search. In general, then, increases in effectiveness of ethics education are related to effects on job search behavior, but only weakly. And the effects can be seen best by focusing on the extreme points on the effectiveness scale.

Table 17: Percent Choosing Effect on Job Search Behavior Based on Ethics Incorporation Effectiveness Rating

Effect	Total (n = 2,314)	Extremely Effectively (n = 240)	Very Effectively (n = 744)	Somewhat Effectively (n = 361)	Not very Effectively (n = 301)	Not at all Effectively (n = 92)
More likely to accept a job offer from a reputable company versus one under investigation*	64%	67%	69%	63%	61%	45%
Think more critically about the ethical culture of prospective employers*	52%	68%	54%	49%	46%	33%
More likely to ask questions about company values in job interviews**	39%	46%	41%	39%	35%	29%
Spend more time closely reading corporate financial statements*	24%	30%	28%	22%	18%	13%

** p (χ^2) < .001; ** p (χ^2) < .02.*

CONCLUSION

It is important to examine what is being done to incorporate ethics education in graduate business education programs to increase understanding of curriculum design issues and to aid in the development and/or improvement of ethics education. The results of this study suggest that ethics education can be effective at graduate business schools and can influence opinions about business ethics, belief in the potential for positive change in business ethics, and behavior and attitudes toward the ethical culture of prospective employers.

The sample of schools in this study are accredited by AACSB International. AACSB's Eligibility Procedures and Accreditation Standards for Business Accreditation (updated in 2004) asks that a:

> school [use] well documented, systematic processes to develop, monitor, evaluate, and revise the substance and delivery of the curricula of degree programs and to assess the impact of the curricula on learning…that will include learning experiences in such management-specific knowledge and skills areas as…ethical and legal responsibilities in organizations and society.

Therefore, it is no surprise to find ethics education incorporated in the curriculum in some way at every school. What is interesting are the various ways schools incorporate ethics and how their methods differ depending on school characteristics. Some of the differences may be attributable to administrative constraints. For instance, executive programs may be less likely to require core course(s) in ethics because of the shorter length of their programs, so for this type of program it may make more sense to use other methods. The difference could also stem from a lack of resources allocated toward faculty and curriculum development. Large schools and the top-ranked schools were more likely to incorporate ethics in a greater number of ways, but they may also be more likely to have the resources to do so.

The results of this study lend much support to an integrated business ethics curriculum. In addition to the number of incorporation methods used, integrated case studies and references to ethics in most courses along with required core course(s) are the most powerful ways to incorporate ethics education effectively, regardless of program type, school size, school prestige and individual characteristics such as gender, age, citizenship, and race/ethnicity. Respondent ratings of the quality of program management, curriculum, and faculty, as well as the students' willingness to recommend their schools, also positively predict the effectiveness of ethics education. On the other hand, the underlying causal mechanism may be the reverse of that posited by the regression model: ethics education effectiveness may produce higher evaluations of program management, curriculum, and faculty and an increased willingness of students to recommend their schools.

Part of this study identified perceptions about the current state of business ethics, the perceived impact of public revelations of corporate misconduct, and the impact these revelations had on how students evaluate prospective employers. This study shows that the more effective the incorporation of ethics in the curriculum, the more likely students are to anticipate positive changes in ethical behavior by businesses, accept a job offer from a reputable company versus one under investigation, think more critically about the ethical culture of prospective employers, ask questions about company values in job interviews, and carefully read corporate financial statements.

If, as Ghorpade (1991) states, "[business schools are to] play a constructive role in reinstating business as a respectable member of society," then efforts by graduate business schools to incorporate ethics in their curricula should be applauded. This study did not investigate pedagogical style and content, but, because of issues of inadequate textbooks, unclear theories and objectives, and other challenges related to the content and teaching of ethics in business schools discussed by such authors as Ghorpade (1991) and Baetz and Sharp (2004), further study is needed to investigate the implementation of the various ethics-education techniques mentioned in this study.

Because an investment in effectively incorporating ethics in business school curriculum appears to influence students' perceptions about corporate misconduct and their subsequent employer choices, it is imperative that schools continue their commitments to assess their curricula, develop and improve faculty training and curriculum in ethics, and integrate ethics education across their curriculum.

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Appendix A: School Sample

School
Arizona State University
Babson College (Franklin Olin)
Baruch College/CUNY(Zicklin)
Baylor University (Hankamer)
Boston College (Carroll)
Carnegie Mellon University
Case Western Reserve University (Weatherhead)
Clark Atlanta University
Clemson University
College of William and Mary
Cornell University (Johnson)
Dartmouth College (Tuck)
DePaul University (Kellstadt)
Duke University (Fuqua)
Florida International University
Florida State University
Fordham University
George Mason University
George Washington University
Georgetown University (McDonough)
Georgia Institute of Technology (DuPree)
Georgia Southern University
Georgia State University (Robinson)
Illinois State University
Indiana University (Kelley)
Kent State University
Lipscomb University
Mercer University
Northeastern University
Ohio State University (Fisher)
Pennsylvania State University (Smeal)
Pepperdine University
Rensselaer Polytechnic Institute (Lally)
Rollins College (Crummer)
Rutgers, The State University of New Jersey
Seton Hall University (Stillman)
Temple University (Fox)
Texas A & M University (Mays)
Texas Christian University (Neeley)
Thunderbird, The American Graduate School of International Management
Tulane University (Freeman)
University at Buffalo, New York State
University of Arizona (Eller)
University of California, Berkeley (Haas)
University of California, Irvine
University of Central Arkansas
University of Colorado at Boulder (Leeds)
University of Connecticut
University of Georgia (Terry)

School
University of Illinois at Chicago
University of Kansas
University of Las Vegas, Nevada
University of Maryland (Smith)
University of Minnesota (Carlson)
University of Missouri, St. Louis
University of North Carolina, Chapel Hill (Kenan-Flagler)
University of Notre Dame (Mendoza)
University of Oklahoma (Price)
University of Oregon
University of Pennsylvania (Wharton)
University of Richmond (Robins)
University of Rochester (Simon)
University of San Francisco (McLaren)
University of South Carolina (Moore)
University of South Florida
University of Tennessee, Knoxville
University of Texas at Austin (McCombs)
University of Texas at Dallas
University of Virginia
University of Washington
University of Wisconsin-Madison
Virginia Commonwealth University
Virginia Polytechnic Institute and State University
Wake Forest University (Babcock)
Washington University (John Olin)
Yale University

THE DELTA CHANGE PROCESS: A MULTIDIMENSIONAL CULTURAL CHANGE APPROACH

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ABSTRACT

This paper develops a new model for organizational change, called the Delta Change Process. This methodology recognizes that change is complex and often viewed with skepticism, and this model considers the various stakeholders in this organizational modification. This new process incorporates elements from a number of previous models such as Appreciative Inquiry, Discontinuous Leap Approaches, Generative Capacity, Cultural Antecedents, Systems Approaches and First/Second/Third Order Transformational Change models. In particular, this model incorporates positive psychological capital practices (as exemplified by Hope Theory and Authentic Leadership).

KEYWORDS: organizational change, Delta Change Process, psychological capital practices

JEL: M1

INTRODUCTION

Creating lasting organizational change is the challenge of facing every leader today, whether in nonprofits, public sector, or corporate environments. In fact, one could make a case that true, transformational change is the *sine qua non* of leadership, and anything less is descriptive of a managerial function (Kotter, 1990; Bennis and Nanus, 1985; Bennis, 2003; Rost, 1991). If the import of change is articulated and identified, and organizations scholars have devoted so much to this subject, then why is change so elusive (Burke, 2002)? One of the key reasons that change is so evasive is that leaders do not adequately emphasize the positive attributes that change brings to an organization, taking into account how change can positively impact the individual, small group, or organizational system under consideration. The *Delta Change Process* synergistically connects various models for organizational change, while considering the emotional impact of these changes on the followers at these various levels.

Burke (2002, p. 13) correctly emphasizes that culture change (i.e., transformational change that occurs within an organizational context) must resonate with the followers' personal values and beliefs, and must connect with "the human forces that either facilitate or prevent transformation" (Duck, 2001). Processes and models provide the structure through which lasting change can occur (Porras & Silvers, 1991; Nadler & Tushman, 1989; Wischnevsky & Damanpour, 2006), while inspired people successfully implement the change (Burke, 1995; Albrecht, 2005; McAllister, 1995; Lee & Allen, 2002). The three critical components of successful organization change implementation centers on (1) leader-follower interactions, (2) effective systems design and structure, and (3) choosing the appropriate change model. The organization of this paper is as follows: In the following section, we will discuss the relevant literature. Next, explanation and clarification of the *Delta Change Process* occurs. Finally, this paper explains the model's systems design and structure. The literature review of change model theory will occur next.

LITERATURE REVIEW

The key role of leadership upon organizational health and effectiveness has been extensively studied (Yammarino, 1993; Jung, Chow, & Wu, 2003; Meyer, Stanley, Herscovitch & Topolnytsky, 2002), and transformational leadership is an oft-quoted approach in the literature (Bass & Avolio, 1990; Lowe &

Gardner, 2001; Kouzes and Posner, 2002). Trust, altruism, empathy, ethical behavior, and other values-based characteristics of leaders are critical elements for building the coalition between leaders and followers (Kanungo, 2001; Kanungo & Mendonca, 1996; Kouzes and Posner, 1995; Bass, 1998; Bass & Steidlmeier, 1999; Greenleaf, 1977; Avolio & Locke, 2002). This paper will assume that a transformational leader is leading the organization undergoing change, and that there is a positive relationship established between executives and employees. Yet, leaders do not operate in a vacuum, and even the "best" leader cannot affect change if a change model is inappropriate.

When discussing change, vision and mission building meetings come to mind, accompanied by strategic planning goals established for the next three to five years. Realignment to organizational goals and directives occur, and external and internal scanning occurs. Managers often utilize the *teleological approach* (Van de Ven & Poole, 1995), although few managers would identify this process by that name.

Managers can utilize other simple processes. Practitioners often implement Lewin's unfreeze/move/refreeze method (Lewin, 1951) and Schein's Unfreezing/Changing/ Refreezing three step processes (Schein, 1987) because of the simplicity and applicability of the concepts. While these three steps are alluring to graduate students and to consultants because of their comprehendible components, these stages are actually quite intricate and sophisticated when delving into the specifics of these steps.

Perhaps the most popular representation of change models are the diagrammatic paradigms, such as the Burke-Litwin model (Burke, 2002) and Nadler-Tushman congruence model (Nadler & Tushman, 1980). Replete with boxes, double-headed arrows and circuitous loops, these models take complicated interactions and illustrate their functions. The *Delta Change Model* adds one more model to the literature.

Before delving into the model itself, a couple of comments regarding the uniqueness of this model are in order. There are three areas of distinctiveness. In the first area of distinctiveness, the *Delta Change Model* incorporates the Hope Theory (Snyder, 2000) as well as the developing area of *positive psychological capital* (or *PsyCap*) which focus on constructs such as hope, resilience, optimism and efficacy (Luthans, Avolio, Avey, & Norman, 2007). The organizational culture adopts these affective factors, providing the impetus and sustained enthusiasm to initiate and continue the change (Luthans & Youssef, 2004). Many change systems do not examine the emotional aspects of employee engagement; yet, this may be *the* most critical factor in determining whether a change model successfully transforms an organization.

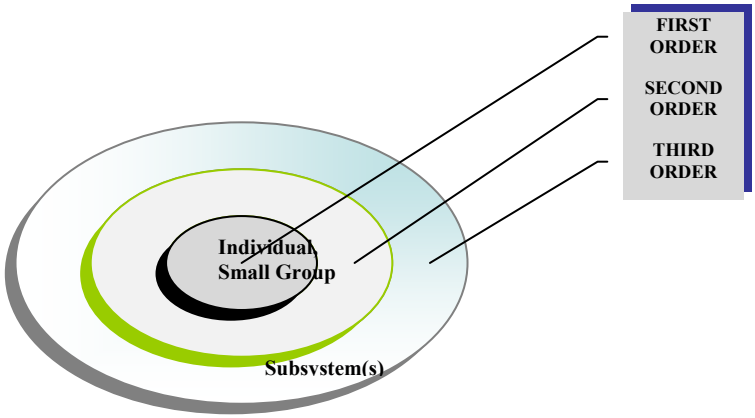
Second, the next area of distinctiveness is found in the inclusion of *cultural antecedents*, which focus on those qualities that each individual brings into the organization, such as ethnic background (Dorfman, Hanges, & Brodbeck, 2004; Rosen, Digh, Singer, & Phillips, 2000), gender (Garcia-Retamero & Lopez-Zafra, 2006; Eagly & Karau, 2002), and spirituality (Zohar, 2006; Neck & Milliman, 1994; Garcia-Zamor, 2003; Wagner-March & Conley, 1999). Leaders and consultants largely ignore these antecedents due to the political sensitivity of these issues, yet they are critical for the success of all organizations.

The final area of distinctiveness focuses on a multi-level approach (Dansereau, Yammarino, & Markham, 1995; Waldman & Yammarino, 1999), examining the impact that the upper-, middle-, lower-level management, and team members have on the change process. More specifically, this is a levels-of-management phenomenon (Waldman & Yammarino, 1999; Hunt & Ropo, 1995).

This multi-level approach is tied into organizational transformation and its resultant performance (Wischnevsky & Damanpour, 2006), and recognizes that change must occur among individuals, dyads, teams, groups, and entire systems. At the most elemental level, individuals, dyads between supervisor and subordinates, and small teams must undergo change. These identified modifications are *first-order changes* (Kimberly & Nielsen, 1975).

Companies hire consultants or executive coaches to mitigate a problem with a small unit, such as with a dysfunctional team or a derailing individual. These changes, while important, are usually insular and somewhat segregated from the overall organizational structure. When the organization monitors and address these episodic changes, these incremental modifications can have far-reaching effect into the larger system. For the most part, first-order changes are discontinuous and driven by external factors (Weick & Quinn, 1999). See Figure 1, below.

Figure 1: Schematic of First-, Second-, and Third-Order Change Designations



This diagram depicts the relationship between orders of change. The first order change occurs with small groups or individuals. The second order change involves subsystems, such as departments, divisions, or large multi-functional bodies. In addition, the third order change impacts the larger system, and ultimately the entire system.

Second-order changes transform the organization at a deeper level, where change is more continuous and perpetual (Weick & Quinn, 1999; Watzlawick, Weakland, & Fisch, 1974). The target of such change processes is a subsystem or subsystems in an organization (Burke, 2002). These changes are ongoing and self-initiating, and have far-reaching effects within the organization. It is planned, strategically implemented, and deliberate (Porras & Robertson, 1992).

A *third-order change* affects the entire system. Multiple factors are identified and examined, and the interaction of these factors are understood "in some causal sequence toward an ultimate goal" (Burke, 2002, p. 106). Other researchers (Waldman & Yammarino, 1999; Klein, Dansereau & Hall, 1994) have used the more descriptive terms of *mixed-determinants models* or *cross-level models,* depending on the independent and dependent variables examined. In all cases, this level addresses systemic, macrocosmic change, and affects the organization as a whole.

With this background in mind, it is now time to describe the actual model itself, with its component parts and various processes.

THE DELTA CHANGE PROCESS MODEL EXPLAINED

As was mentioned earlier, organizational change oftentimes utilizes Lewin's three-step model. This is not merely due to its simplicity, but because Lewin uncovered the fundamental element of change. Weick and Quinn (1999, p. 363) describes Lewin's insightfulness in this way:

> Lewin's (1951) three stages of change-unfreeze, change, refreeze-continue to be a generic recipe for organizational development. As Hendry (1996) notes, "Scratch any account of creating and managing change and the idea that change is a three-stage process which necessarily begins with

> a process of unfreezing will not be far below the surface. Indeed it has been said that the whole theory of change is reducible to this one idea of Kurt Lewin's."

O'Toole (1995) identified 33 reasons why change is resisted, and every organization faces one or more of these deterrents whenever a change initiative is launched. One of the reasons why executives may be hesitant to include key constituents in change discussions is that these dialogs can quickly degrade into grousing sessions. One of the ways to create a positive milieu in a change process is to utilize the *positive psychological capital* approach (Luthans & Avolio, 2004; 2007). Organizational citizenship behavior, humor, self-determination, and other affects (Luthens et al., 2007) are incorporated within this positive psychological capital approach, and are integrated into the Delta Change Process model.

This model first utilizes *Appreciative Inquiry* to begin the change dialog with the key constituents in the organization (Bushe, 1995; Cooperrider, 1990). Ideally, the change team is comprised of people who are open to change (known as *champions*). These champions do not have to be strong advocates. If fact, it would be advisable to have a few "naysayers" in the discussion, because their views may represent the views of other cynics among their associates. There are just two caveats to consider: (1) The naysayer must be reasonable (that is, rational arguments will abate cynicism), and (2) this naysayer must have a wide network of contacts within the company (affecting change throughout the company). These champions from all levels of the organization will be the nucleus of the transformative process.

One upstart entertainment company looked to create its own new culture while integrating employees from other studios. The approach suggested by the consultant was to discover the meaningful values and characteristics of the previous studios, and to meld them into the new culture whenever advisable. This approach created optimism throughout the company, and people became excited about the possibilities. Appreciative inquiry is a wonderful inaugural tool because it challenges participants to identify those factors that resonate with the emotions of the individuals.

In this first phase, if an organization is dysfunctional, it may need to address some first-order concerns before moving on to second and third-order processes. For example, if a leader is arrogant, critical, alienates people and micromanages, then executive coaching or other rehabilitative means might have to be employed before anyone in the company will trust his or her leading (Gravenkemper, 2002). In addition, if the organization is cynical, critical, and disillusioned, then trust needs to developed (Driscoll, 1978; Kouzes & Posner, 2002). After addressing the dysfunction and establishing trust, the champions can move onto the next phase.

In the *Discontinuous Leap Approach*, the champions envision an innovative organizational culture, structure, and procedural model so that they create a new reality. This activity goes far beyond appreciative inquiry in intent. Frantz (1998) explains that the goal is make a quantum leap from old presumptions, protocol or practices, and to create an entirely new reality. Established paradigms, norms, and ideologies are to be disregarded and discarded, and a never-before realized existence would come into being.

A word picture that Frantz (1998) provides in illustrating the *Discontinuous Leap Approach* has to do with Columbus' explorations in 1492. Columbus had to overcome the barriers that he faced (uncharted waters, unknown foreigners, and unimaginative obstacles). Columbus had to overcome the old assumptions and navigational norms that existed at that time, and set out for uncharted territory. When Columbus overcame his (and his crews') fear of the unknown, they discovered new lands. This would never have occurred had Columbus remained in the safe confines of his homeland.

Frantz also notes that fear of the unknown may paralyze change agents, and that anxiety barriers could prevent change from occurring. Senge's work regarding *mental models* (2006) is most helpful here.

Figure 2: The Delta Change Process Displayed

Appreciative Inquiry	**Discontinuous Leap Approach**	**Generative Capacity**	**Cultural Antecedents**	**Evaluate & Redirect**
Recruit change champions at various levels	Champions are directed to dream outrageously	Champions create a new story	Champions inquire about others' culture	Champions reexamine the morale
Identify the strengths of the organization	Oftentimes anxiety must be addressed	Artifacts and archetypes are created	Asking if cultural values are considered	Productivity & Organizational *Spirit* are noted
Key question: In what areas are we exceptional?	Key question: In what ways could we become extraordinary?	Key question: What is the soul of the organization?	Key question: Are cultural values & beliefs noted?	Key question: Is the organization transforming?
Key focus: Retain those positive traits	Key focus: People identify idealized future	Key focus: Inspire people's hearts	Key focus: Being inclusive to the spirit of the individual	Key focus: Look to redirect if necessary

This figure shows the key phases of the Delta Change Process Model. The key phases are identified: (1) Appreciative Inquiry, which identifies the strengths of the organization; (2) Discontinuous Leap Approach, which imagines an idealized future; (3) Generative Capacity, which creates a new "story" for the organization; (4) Cultural Antecedents, which examines representative cultures; and (5) Evaluation and Redirection, which critiques the transformation at the first, second, or third order change levels.

Senge observes that those insecure or threatened leaders can subvert transformational change, and identifies the main culprits as:

> Control-oriented managers who are threatened by new levels of openness and candor; delays in metrics that show costs of changes but take time to show benefits; polarization and competition between converts to a new way of doing things and people trying to conserve mainstream culture; and fragmented management structures that thwart relationship building among different groups of innovators (p.98).

It is at this point that an *authentic leader* can provide valuable direction (Luthans & Avolio, 2003; May, Chan, Hodges, & Avolio, 2003). The *authentic leader* brings a caring and engaged disposition to the dialog, and focuses on strengths and not weakness. S/he can help facilitate the process of dreaming great dreams, like successfully landing a man on the moon, or eliminating Apartheid. They encourage their people be creative, pursue the impossible, and provide resources for success. These leaders jump curves.

The third phase is the *Generative Capacity* phase. The purpose here is to create a new story for the company. Snowden's (2005) *Narrative Causality Theory*, creates and/or reconfigures the main characters in the story. Anecdotes move peoples' hearts, and these stories can take on legendary status. For example, people describe Herb Kelleher at Southwest Airlines as a humble servant-leader, who would take the time to hug people when he saw them in the hallway, personally tended to some disgruntled ticketing agents in a distant city, and allowed employees to help fellow Southwest Airline hurricane victims on company time. In fact, Kelleher voluntarily paid for vans to transport those employees to the hurricane victims damaged homes. An anecdote like that lays a foundation of servant-leadership throughout Southwest Airlines, and becomes part of the fabric of that organization.

In the case of Southwest Airlines, these stories emerged out of Kelleher's leadership. However, *narrative causality theory* directs organizations to create a new story. In *narrative causality theory,* creating the story (known as the *artifact*) is the goal. The facilitator instructs change champions to write down leadership characteristics on a post-it note, and then place these post-its on a board. A clustering process categorizes similar characteristics, labeling these categories (e.g., the *benevolent boss* or the *wise sage*). The group decides on any additional characteristics that they would expect to see in this mythical individual (called an *agent*), as well as remove any undesirable traits. These *agents* are then weaved into a story, and that story becomes the "vision" for the organization.

In one study on female executives, the women interviewed wrestled with the notion of gender issues and leadership (Takamine, 2008). The women executives were entering uncharted territory, and creating an *artifact* or new story for their predecessors. Some female executives felt that they had to behave as men behave, while other women believed that they could create a new model for leadership in their organization. The latter group of women was creating a new story for themselves and those promoted after them.

It is not enough to come up with a new *agent*, however. This agent must be the lead in a comprehensive story of how the organizational culture will change, presumably for the better. An effective story must touch the emotion in some way, bringing hope (as with *Hope Theory*, Snyder, 2000), inspiration, challenge, or excitement. As Snyder (2000) indicates, a company's narrative can positively affect profit margin, retention, organizational citizenship behavior, and commitment. The rewritten story must elicit a positive response from the listeners.

The fourth phase examines the *cultural antecedents* of an organization. As was mentioned previously, the issues under consideration are ethnicity, gender, nationality, age, sexual preference, spirituality, generational status. This is where an organizational change initiative can easily fail.

More companies are becoming more open to matters of spirituality in the workplace, for example (Neck & Milliman, 1994; Garcia-Zamor, 2003). This used to be a taboo subject, but more and more companies are allowing workers to celebrate their spirituality and/or religion in the corporation, as long as it does not become a distraction or a contentious activity. The same holds true for embracing other multicultural aspects.

For example, the ancient Hawaiians' concept of *ho'omanamana* relates to the life force of the ancient Hawaiians, similar to the *Chi* in Asian philosophy (Carruthers, 2007). This speaks of health and wellness, and denotes spiritual power. When a community (*Ohana*) was at peace with itself, it functioned at this high level. If there was trouble (*pilikia*) recognized within the community (*Ohana*), the *kahuna* (traditional healer) restored the *Ohana*. This process of restoration is *ho'oponopono.*

Imagine that there was any ill-feeling or dysfunction from the chiefs (*ali'i*), or wise elders (*kapuna*), a ritual healing would occur to rid the group of the *hala* (transgression) and *hihia,* or negative energy (Coates, Gray, & Hetherington, 2006). The *kahuna* asks the affected parties to share any feelings, or *mana'o.* Then all affected parties ask for forgiveness from the *mihi*, or wrongdoing. The final closure (*pani*) occurs when the relational bonds are reestablished, *aloha* (health) occurs*,* and the final prayers are recited (Coates, Gray, & Hetherington, 2006).

In the modern context, if there are any problems with the executives (*ali'i*), the people with seniority (*kapuna*) or experts (*kahuna*), much damage could occur. The gap between ho'omanamana and disharmony is harmony, balance, and forgiveness (*kala*). The ho'oponopono (change) process bridges this gap.

In a Hawaiian cultural context, this understanding would be critical. Similarly, Christianity, Judaism, Islam, Atheism, multi-generationalism, gender differences, sex roles, etc. would play a critical role in the work milieu when considering change. The impact of a person's values and beliefs are important in bringing positive psychological capital to an organization. The goal is to create an environment where every group feels included and valued. This restoration must consider a person's core values.

The *Cultural Antecedent* phase of the *Delta Change* Process might be the most critical aspect of the model. Leadership team members (or champions) rarely discuss such sensitive issues like gender, age, spirituality, ethnicity, etc., but these issues significantly influence the success or failure of any change process. In a Fortune 100 space technology company, training occurred which attempted to advance mid-level Asian Pacific American managers into executive advancement. In the course of a discussion, the question arose regarding the composition of the executive committee. The trainer asked the participants, "Has there ever been an Asian Pacific American CEO?" The answer was, "No." The next question was, "If you could imagine that the next CEO was Asian Pacific American, what traits/talents/persona/ethic you would expect this individual to have?" The responses were very enlightening. For some, she was a woman. For another individual, it was a male that was around 5'6." These images ran counter to the picture of the executives on the company website. For the first time, these Asian Pacific Americans could imagine becoming a CEO of a major technological giant, where they could never have imagined such a possibility before.

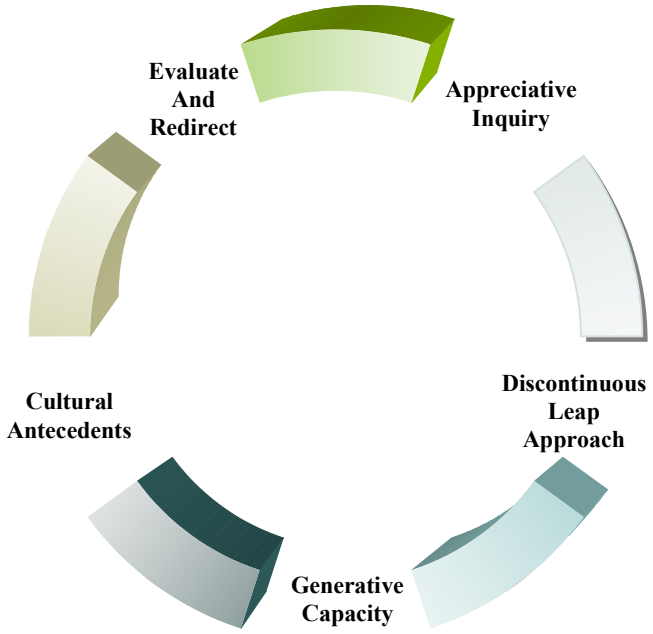
Finally, the last phase periodically *evaluates and redirects* the change process. At prescribed intervals (e.g., one month, three months, six months, one year, etc.) the change champions would take the "pulse" of their coworkers throughout the organization, and report on progress, decline, anecdotes and casualties. The *Delta Change Process* Model does not to operate in linear fashion, as depicted in Figure 2, but in a more circular pattern, as in Figure 3, below.

CONCLUSION

Change processes have often neglected the most vital ingredient for true transformation: the people. Executives and researchers emphasizing non-affective, rational approaches often discount the feelings of their people because these feelings are difficult (if not impossible) to control. However, these psychological and emotional dynamics are, perhaps, the key differentiating factor in determining whether a change process becomes a temporary anomaly within an organization's life cycle, or whether it becomes a transformative experience.

This paper described *The Delta Change Process* and its component parts, including *Appreciative Inquiry, Discontinuous Leap Approaches, Generative Capacity, Cultural Antecedents,* and *Evaluation and Redirection. The Delta Change Process* identified Hope Theory, Systems Thinking, Authentic Leadership, etc. as the theoretical foundation for this model. Utilizing this process, organizations can prescribe and strategically implement transformational change, while tapping into the positive psychological capital of the organization.

Figure 3: Cyclical display of the Delta Change Process



This diagram demonstrates the cyclical nature of the Delta Change Process. This cyclical approach denotes the practical dynamic of the Delta Change Process, which may revert to previous stages or skip stages during the change process. As the system encounters new changes, modifications in the various phases will emerge.

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IS CAREER MANAGEMENT THE PANACEA TO RETAINING VITAL STAFF?

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ABSTRACT

A continuing organizational issue for the management of human resource has been the retention of vital employees. As organizations battle to get the most from their existing people in an environment characterized by skill shortages, the role of human resource practices in fostering employee engagement and commitment is paramount. As firms and employees struggle to find a balance between career longevity and flexibility, the traditional role of career management as an inducement for individuals to stay with the firm is questioned. This paper reports the findings of an Australian study, which examined the current relationship between human resource management practices and the retention of vital employees working in nine organizations. Although past research has pointed to career management as a retention strategy tool, this research specifically points out that selection practices, remuneration and recognition are key factors which influence employee commitment and thereby retention. The findings of the study have salient implications for human resource academics and practitioners.

KEYWORDS: vital employees, organizational commitment, retention strategy, career management

JEL: M1

INTRODUCTION

A continuing organizational issue for the management of human resources has been the retention of their vital employees. As organizations battle to get the most from their existing people in an environment characterized by skill shortages, the role of human resource practices in fostering employee engagement and commitment is paramount. As firms and employees struggle to find a balance between career longevity and flexibility, the traditional role of career management as an inducement for individuals to stay with the firm is questioned.

Traditionally, within the employment relationship, employees exchanged their loyalty and hard work for the promise of job security. In the contemporary environment, changes in organizational structure towards more flexible work practices and the decline in job security have altered the psychological contract between employer and employee (Allan, 2002; Wiens-Tuers, 2001). The new form of psychological contract is visible in placement practices, which see organizations focus on non-core and part-time workers to gain flexibility at lower cost (Cappelli, 1999; Kalleberg, 2000). Because of these organization-wide changes, the essence of attachment between employer and employee has changed.

Current employers emphasize "employability" rather than long-term loyalty in a specific job (Cappelli, 1999; Ko, 2003). The trend these days seems to be geared towards having a ‘career portfolio’ (a series of job held by an employee) (Handy, 1995; Hays & Kearney, 2001). Replacing the old employment deal, the new psychological contract suggests that the employer and the employee meet each other's needs for the moment but are not making long-term commitments.

It is suggested therefore, that commitment to one’s professional growth (or the adoption of personal career management strategies) has replaced organizational commitment (Bozeman & Perrewe, 2001; Powers, 2000). Instead of job security, employees now seek job resiliency; opportunities for skill

development, and flexibility in order to quickly respond to shifting employer requirements (Barner 1994). Employees seem to take greater responsibility for their own professional growth in order to increase their career marketability and welcome the idea of the boundary-less career (Finegan, 2000).

Hence, the role of formal organizational career management programs in retaining core staff is questioned. Whereas in the past organizations have sought to adopt such programs in the belief that they will benefit not only individual performance but also increase employee commitment (see Hall, 1976; Shore, Barksdale, and Shore 1995), the assumptions upon which career management programs are based have been shown to produce negative consequences. Certainly, concerns about the returns from heavily investing in career development have led some organizations to question whether traditional career management programs should be maintained (Sturges, Guest, Conway & Mackenzie Davy, 2002).

LITERATURE REVIEW

Career management (or organizational career management) has been described as a series of formal and less formal activities designed and managed by the organization to influence the career development of one or more employees (Arnold, 1996). Whilst career management and career self-management (which is under the control of the individual) are not mutually exclusive, successful career management programs are based on the following assumptions: individuals involved in career planning will more likely achieve personal aspirations; clarification of organizational plans and individual opportunities will reduce anxiety and frustration in employees, leading to more positive attitudes toward career progress and organizations; and providing career relevant information and assistance will narrow an employee's career focus and bind them more closely to the organization (Ganrose & Portwood, 1987).

These assumptions are quite simplistic and can have negative consequences. For instance, greater effort in career planning can raise levels of expectations, but does not guarantee advancement in an organization. Unless an organization can meet these aspirations for the future, individuals may seek opportunities elsewhere to justify the effort they have expended. Greater certainty about career plans may backfire if individuals discover that their career plans may not match up with available organizational opportunities. This mismatch may lead to lower levels of satisfaction and may ultimately affect commitment and thereby retention.

Moreover, if individuals have knowledge of alternatives, and these alternatives match up with organizational plans, more organizationally desirable outcomes (i.e. greater performance, job satisfaction and commitment) may be achieved. However, if the solutions offered by the organization do not match those an employee values, the individual may search for alternative career paths external to the current employer.

Whilst such outcomes might work in the positive if those individuals the firm would rather leave do so, this outcome has serious implications for retaining vital staff, which is described earlier as a central role of career management programs. In fact, such outcomes have led a number of firms to query whether they should maintain the more traditional career management system or if they should allow great career self-management at the risk of losing vital staff. Organizational commitment, it appears, is at the centre of this dilemma both in shaping the reactions to career management practices and as indicator of the impact of these practices (Sturges et al., 2002).

Commitment is a belief which reflects "the strength of a person's attachment to an organization" (Grusky, 1966, p. 489). Researchers have suggested that reciprocity is a mechanism underlying commitment (Angle & Perry, 1983; Scholl, 1981) and that employees will offer their commitment to the organization in reciprocation for the organization having fulfilled its psychological contract (Angle & Perry 1983; Robinson, Kraatz & Rousseau, 1994). By fulfilling obligations relating to, for example, pay, job security,

and career development, employers are creating a need for employees to reciprocate, and this can take the form of attitudinal reciprocity through enhanced commitment and consequently influence employees to stay with the organization (Becker & Huselid, 1998; Cappelli, 2000; Furnham, 2002; Oakland & Oakland, 2001; Wagar, 2003)

Previous studies on the concept of commitment (see Mowday, Porter & Steers, 1982; Meyer & Allen 1991) have substantiated that employee commitment to the organization has a positive influence on job performance and a negative influence on intention to leave, or employee turnover. In addition, empirical evidence also strongly supports the position that intent to stay or leave is strongly and consistently related to voluntary turnover (e.g. Dalessio, Silverman & Schuck, 1986; Griffeth, Hom & Gaertner, 2000; Lambert, Hogan & Barton, 2001; Mathieu & Zajac, 1990). Of the three commonly cited components of commitment, (i.e. continuance, normative and affective) affective commitment is the most studied dimension (Aven, Parker & McEvoy, 1993; Dunham, Grube & Castaneda, 1994). Affective commitment is considered to be an affect-focused attitude towards the organization, which represents an emotional bond between an employee and his or her organization (Allen, 1996). Individuals possessing high levels of affective commitment identify with, are involved in, and enjoy membership in the organization, and are therefore more likely to remain with the organization.

Ulrich (1998) has suggested that engaging employees' emotional energy gains commitment toward the organization. The most fundamental of those processes thought to influence affective commitment is an employee's personal fulfillment based on met needs and positive work experiences (Meyer & Allen, 1997). Although employees may develop affective commitment through relatively unconscious associations with positive work experiences (classical conditioning) of which organizational career management activities is a component (see Sturges et al., 2002), research suggests that affective commitment can be consciously influenced by human resource practices such as collaboration and team work, high autonomy job design, training and development, rewards, and participation in decision making (Agarwala, 2003, Meyer & Allen, 1997, Ulrich, 1998). Despite substantial literature on HRM "best practices and high performance practices," there is little consensus among researchers and practitioners as to precisely which HRM practices effectively combat attrition of the vital employee group (Becker & Gerhart, 1996; Marchington & Grugulis, 2000; Parker & Wright, 2001; Pfeffer, 1998; Wagar, 2003).

Reviews of the diffusion and penetration of high performance work practices in organizations (Pils & Macduffie, 1996; Wood & de Menezes, 1998) indicate that a fragmented and ad hoc approach prevails. For example, the Wood and de Menezes (1998) study revealed different patterns in the use of high performance work practices in firms. Most firms invested only in skill formation and direct communication, which can affect job related commitment to a limited extent. There were great variations when it came to performance appraisal, reward systems and information disclosure that have immense potential to influence commitment to the organization.

Several studies of progressive HRM practices in training, compensation and reward have revealed that these can lead to reduced turnover, absenteeism, better quality work, and better financial performance (Arthur, 1994; Davies, 2001; Delaney & Huselid, 1996; Macduffie, 1995; Snell & Dean, 1992; Tower Perrin, 2003). Overall, studies at the organization level suggest that such motivation-oriented human resource activities are more likely to be associated with perceived organizational support and commitment than skill oriented activities (Delery, 1998; Huselid, 1995; Whitener, 2001). This has an implication for the role of career management practices which is primarily based on skill oriented activities.

A challenge for human resource practitioners is to design holistic systems that influence commitment and promote positive work experiences. This is similar to the idea that it is necessary to implement "bundles" of human resource management practices (Macduffie, 1995; Youndt, Snell, Dean & Lepak, 1996) to positively influence organizational performance (Huselid, 1995).

A number of employee retention-commitment models particularly advocate the advantages of high involvement or high commitment human resource practices in enhancing employees (Clarke, 2001; Mercer, 2003; Parker & Wright, 2001). Previous work (see Arthur, 1994; Becker & Gerhart, 1996; Huselid, 1995; Shaw, Delery, Jenkins & Gupta, 1998) indicated that high-involvement work practices will enhance employee retention. The identified HR practices included selective staffing, competitive and equitable compensation, recognition, and comprehensive training and development activities (career development, challenging opportunities) (Macduffie, 1995; Snell & Dean, 1992; Youndt et al, 1996).

Recent studies suggest that there is a set of best practices for managing employee retention (Baron & Kreps, 1999; Clarke, 2001; Mercer, 2003; Tower Perrin, 2003; Watson Wyatt, 1999). Chew and Entrekin (2004) highlight eight key factors influencing retention. These factors were identified via an in-depth Delphi study involving a panel of experts comprising of academics, HRM practitioners and industrial psychologists followed by a series of in-depth interviews with HR managers of 12 Australian organizations. These HRM retention factors were categorized into two bundles: 1) HR factors (person organization fit, remuneration, career management, challenging opportunities) and 2) organizational factors (leadership behavior, teamwork relationship, company culture and policies and satisfactory work environment). Similarly to Fitz-enz (1990), this study concludes that retention management of employees is influenced by several key factors, which should be managed congruently and thereby implies that both organizational factors and human resource practices may influence commitment.

However, which factors have more explanatory power in influencing organizational commitment? Is career management the panacea to retaining critical staff? To date this question has not been explored. This study therefore, aims to investigate the impact of these practices in influencing organizational commitment via a hierarchical regression analysis.

THE STUDY

The sample population used in this study consisted of core employees of nine large Australian organizations. Vital employees were defined as permanent or core workers with the following key characteristics: 1) possess knowledge, skills and attributes (KSA) aligned with business operation and direction, 2) are central to productivity and wellbeing of the organization, 3) provide a competitive edge to the organization, 4) support the organizational culture and vision and 5) possess KSA that are relatively rare or irreplaceable to ensure the success of the organization (Allan & Sienko, 1997; Chew, 2003; Gramm & Schnell, 2001). The participating organizations were from various industry sectors which included health-care, higher education, public sector and private sector (manufacturing, engineering, high technology etc). A total of 456 respondents completed surveys were received, resulting in a 57 per cent response rate. The average age of respondents was 40-49 years, and participants had an average of 8-12 years of organizational tenure. Fifty-five per cent of the sample was male and 94% had tertiary qualifications.

Measures

The choice of variables reflects the view that both organizational factors (organizational bundle) and human resource practices (HR bundle) influence commitment perceptions of vital employees. All items were scored along a seven-point scale, ranging from (1) strongly disagree to (7) strongly agree. The organizational factors bundle was measured by four variables: leadership behavior, teamwork relationship, organizational culture and the work environment.

Leadership behavior was measured via a four-item scale. The scale consisted of items adapted from two validated scales: (1) the Multifactor Leadership Questionnaire devised by Bass and Avolio (1990), which

measured transformational leadership and (2) the eight-item scale by Hartog, Van Muiijen and Koopmen (1997) which measured inspirational leadership. The adapted scale used in this study measured leadership behavior in terms of leadership effectiveness, extra effort and leadership satisfaction. Teamwork relationship was measured via a four-item scale developed by Bass and Avolio (1990). Items tapping: team leadership and relationship of employees and peer leadership, were included in this study.

A five-item scale modified from The Organization Profile Questionnaire (Morita, Lee & Mowday, 1989; O'Reilly, Chatmen & Caldwell, 1991; Sheriden, 1992) and developed by Broadfoot and Ashkanasy (1994) was used to measure organizational culture. The scale measures the degree the organizational structure limits the action of employees, and focuses on the influence of policies and procedures, and tests organizational goal clarity and planning.

Work environment was measured via a seven-item scale designed to measure humanistic and socialization features, physical work conditions and organizational climate (Broadfoot & Ashkanasy, 1994; Cammann, Fichman, Jenkins & Klesh, 1979; Smith, 1976). The human resource bundle was measured by four practices relating to: selection; remuneration and recognition, opportunities for training and career development, and job design. Selection was measured via a four item scale developed by Netemeyer, Boles, Mckee and McMurrian (1997). This construct reflects the person-job fit element of selection (Cable & Judge, 1997).

Remuneration and recognition was measured with a five-item scale which focused on intrinsic and extrinsic rewards (Broadfoot & Ashkanasy, 1994; Cammann et al, 1979; Seashore, Lawler, Mirvis, Lawler & Cammann, 1982). Extrinsic rewards measured the employee's view of the economic rewards from his/her job. It includes pay, benefits, and job security. The scale also measured the degree to which intrinsic rewards such as recognition are present in the job.

Career management was measured via a four-item scale developed by Broadfoot and Ashkanasy (1994) which focused on whether the organization expends sufficient effort in providing opportunities for people to develop their skills, and the adequacy of the training. The five-item job design scale explored the challenge of the job via the five core job characteristics as described within the Job Diagnostic Survey (Hackman & Oldham, 1975).

Organizational commitment was measured using the abridged nine-item Organizational Commitment Questionnaire (OCQ) scale developed by Mowday, Steers and Porter (1979) in order to take into account criticism of the original 15-item scale (see O'Reilly & Chatman, 1986 and Reichers, 1985). Compared to other measures of employee commitment, the OCQ has received the most thorough and generally positive evaluation (Meyer & Allen, 1997). The scale draws, upon Angle and Perry's (1981) classification of commitment into two components: 1) affective commitment and 2) calculative commitment. Affective commitment was considered in this study.

Data Analysis Procedures

A two-step approach was undertaken for the data analysis. First, the measures used in the study were validated via a factor analytical process and the computation of Cronbach's (1951) alpha. Second, the relationships amongst the study variables were examined via the preparation of a correlation matrix and further tested via a hierarchical regression analysis.

The hierarchical regression analysis was run in order to identify which group of independent variables was more useful in predicting the dependent variable, and to eliminate those independent variables that do not provide any additional prediction to the independent variables already in the equation (Tabachnick & Fidell, 2001).

Previous studies (Macduffie, 1995: Wright, Dunford & Snell, 2001) support the notion that practices within bundles are interrelated and the combined impact of practices in a bundle could be specified in two simple alternatives: an additive approach and a multiplicative approach. Statistically, the additive combination of practices has the desirable property that the sum of normally distributed variable scores is still normally distributed, which is not true for the multiplicative product. Conceptually, a multiplicative relationship implies that if any single organizational practice is not present, the "bundle" score (and effect) should be zero. However, Osterman (1994) argues that, "although practices in a bundle are expected to be interrelated, the absence of a particular practice will not eradicate the effect of all other practices, but will weaken the net effect of the bundle" (p. 176.).

This study has adopted the additive approach in the interests of parsimony. Statistically it also makes sense to separate out these bundles in this way to show the true effect. Regression is best when each IV is strongly related to the DV but uncorrelated to other variables (Tabachnik & Fidell, 2001). Thus the regression solution is extremely sensitive to the combination of variables that is included in it. Whether or not independent variables (IVs) appear particularly important in a solution depends upon the other IVs in the set. As such, this additive approach will allow some conclusions as to the efficacy of organizational versus HR practices in impacting the retention of vital staff, whilst simultaneously examining the specific relationship between career management and commitment.

Demographic factors were included as control variables in the regression equation, as the first step. The independent variables consisted of eight factors grouped into two sets or bundles (i.e. HR factors and organizational factors). Organizational factors were entered as the second step in the equation and the human resource bundle practices were entered as the third and final step of the regression.

RESULTS

Descriptive statistics, reliabilities and correlations are presented in Table 1. The standard deviations of the main study variables ranged from 1.06 to 1.48, suggesting that none of the measures were marked by excessive restrictions in range.

The correlation matrix presented in Table 1 revealed that all independent variables have significant positive correlations with organizational commitment. The direction of the association ranged from r= 0.52 to r=0.66. These results indicate no multi-co linearity and singularity problems.

The demographic variables showed only weak associations with the commitment dimension. Occupation and industry had no significant relationship with commitment and were removed from further analysis. This result may be, in part, an outcome of the various industry groups that were represented amongst the data set (Green, 1991). However, as the size of the industry sub-sets was small, this was not analyzed further, but does present an area for future investigation.

Table 1: Means, Standard Deviations and Correlations for all variables (n=457)

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	
1. Age	NA	NA	-												
2. Gender	NA	NA	0.06	-											
3. Occupation	NA	NA	0.02	0.04	-										
4. Industry	NA	NA	0.01	0.02	0.1	-									
5. Selection	4.3	1.1	-0.02	.15**	0	.17**	**0.54**								
6. Remuneration/recognition	3.98	1.2	.09**	0	0	.10*	.46**	**0.76**							
7. Career management	4.09	1.5	-0.04	.11*	0.1	.15**	.50**	.54**	**0.82**						
8. Job Design	4.75	1.2	0.04	.98*	.14*	.26**	.48**	.52**	.59**	**0.85**					
9. Leadership	3.66	1.4	0.01	.08**	0.1	.12**	.61**	.60**	.65**	.62**	**0.94**				
10. Teamwork	4.57	1.3	-0.06	0.05	0.1	0.04	.55**	.50**	.55**	.54**	.69**	0.89			
11. Organizational culture	4.34	1.3	0.04	0.08	0.1	0.02	.51**	.53**	.62**	.56**	.71**	.59**	**0.85**		
12. Work environment	4.3	1.4	0.07	.14*	.11*	0.02	.59**	.52**	.54**	.56**	.68**	.56**	.56**	**0.7**	
13. Commitment	4.47	1.1	.17**	.18**	0.1	0.07	.55**	.57**	.52**	.57**	.62**	.57**	.58**	.66**	**0.8**

*Note. Coefficient alpha reliability estimates are on the diagonal and in bold. Gender was categorized 1=male, 2=female. This table presents means, standard deviations, reliability estimates and correlations of the study variables. *p<.05 **p<.01*

However, both age (r= .17, p<0.001) and gender (r =.18, p<0.001) were positively and significantly correlated with organizational commitment. Age and gender were the control variables included in the regression analyses. The results of the hierarchal regression analysis are presented in Table 2.

Table 2: Hierarchical Regression Results (standardized coefficients) with Organizational Commitment as Dependent Variable

	Commitment		
Variables	**Step 1**	**Step 2**	**Step 3**
Control Variables			
Age	.14**	.10*	.14**
Gender	.15**	.06	.07
Organizational Variables (Bundle 1)			
Leadership		.14*	.01
Teamwork		.14*	.08
Organizational Culture		.13*	.07
Work Environment		.25***	.09
HR Variables (Bundle 2)			
Selection Practices			.18***
Remuneration/Recognition Practices			.27***
Career Management Practices			.06
Job Design Practices			.07
R2	.05	.36	.44
Adjusted R2	.04	.34	.43
F	10.88***	41.47***	35.10***
Change R2		.31	.08
F for change R2		54.21***	16.81***

This table presents the regression results of organizational and HR variables on organizational commitment.
**p<.05, **p<.01, ***p<.001*

Table 2 shows that the demographic features of age and gender had a significant effect on commitment in Step 1. However, this effect was rendered insignificant for gender when the organizational bundle was

included at Step 2 of the regression. Whereas the organizational factors all contributed to explaining over 30% of the variance in commitment at Step 2, no organizational factor variables showed a significant relationship with commitment at Step 3.

At initial glance therefore, it appears that human resource practices fully mediate the influence of organizational factors on commitment. The addition of the HR bundle explained a further 8% of the variance in commitment. This is an important result in that it suggests that it is HR practices which will influence commitment of vital employees rather than other organizational features. However, closer inspection of Table 2 reveals that only two HR practices, selection, and reward and recognition are statistically significant predictors of commitment. Hence, the results point out that career management practices do not impact on the retention of vital employees.

DISCUSSION

A plethora of past studies have revealed that employees interpret human resource practices as indicative of the personified organization's commitment to them (Eisenberger, Fasolo & Davis-LaMastro, 1990; Setton, Bennett & Liden, 1996). Some researchers suggest that for positive work experiences to increase organizational commitment and to reduce turnover intention, employees must believe that such experiences are a result of effective management policies and practices (Parker & Wright, 2001). As a result employees reciprocate their perceptions accordingly in their own commitment to the organization. One such effective management policy has been the role of career management in motivating and retaining staff. However, the findings of this study provided empirical evidence to support that career management is not the answer to retaining staff, rather two HR practices – selection (person-job fit) and remuneration and recognition are instrumental in influencing commitment over and above other HR and organizational factors.

Essentially, the findings suggest that people, who are well suited for the job and/or organization, are more likely to feel attached and committed to the organization. The concept of organizational fit (Brown, 1969; Kidron 1978; Steers 1977; Weiner, 1982) identifies convergent goals and values between the individual and the organization as an important predictor of affective commitment.

Lauver and Kristof-Brown (2001) found that both person-job fit and person organization fit predicted job satisfaction; however, person organization fit was a better predictor of intention to quit. Thus, people who are not well suited for the job and /or organization are more likely to leave than those who have a good person-job or person-organization fit. Lee, Ashwood, Walsh and Mowday (1992) espoused that an employee's satisfaction with a job, as well as propensity to leave that job, depends on the degree to which the individual's personality matches his or her occupational environment. This implies that the organization should not only match the job requirements with person's KSA but should also carefully match the person's personality and values with the organization's values and culture (Kristof, 1996; Rhoades, Eisenberger & Armeli, 2001; Van Vianen, 2000).

This study also revealed that rewards and recognition play a key role in the commitment of vital staff. Studies have supported that a fair wage is the cornerstone of the contractual and psychological agreement between employees and employers (McCallum, 1998; Parker & Wright, 2001). In addition numerous recent studies have highlighted the rewards-retention link (Mercer, 2003; Tower Perrin, 2003; Watson Wyatt, 1999). In particular, studies by Bassi and Van Buren (1999); Boyd and Salamin (2001); Stein (2000) and others have revealed that companies which provide remuneration packages superior to the market for critical talent including special pay premiums, stock options, or bonuses can expect greater organizational commitment.

Although remuneration provides recognition, other forms of non-monetary recognition are also important for the vital employee group. Davies (2001) purported that employees tend to remain with the organization when they feel their capabilities, efforts and performance contributions are recognized and appreciated. Similarly, recognition from managers, team members, peers and customers has been shown to enhance commitment (Walker, 2001). Particularly important to the employees are opportunities to participate and to influence actions and decisions (Davies, 2001; Gold, 2001). Overall this finding supports that employers need to increase their commitment to the use of rewards as essential elements of talent management programs. It appears therefore that it is important for companies to use their reward budget effectively to differentiate the rewards of the top performers, thus driving an increase in the return on human capital investments.

The study also showed a significant and positive relationship between age and organizational commitment, irrespective of either organization or HR factors. This finding is consistent with previous research (Alutto, Hrebiniak & Alonso 1973; Cohen & Lowenberg, 1990). Mathieu and Zajac (1990) found that age was significantly more related to affective commitment than to continuance (calculative) commitment. Tenure was excluded from this study because studies by Meyer and Allen (1997) supported that employees' age may be the link between tenure and affective commitment. Werbel and Gould (1984) revealed an inverse relationship between organizational commitment and turnover for nurses employed more than one year, but Cohen (1991) indicated that this relationship was stronger for employees in their early career stages (i.e. up to thirty years old) than those in later career stages.

There are a number of limitations of the study however, which need to be acknowledged. It is important to recognize that other antecedents of commitment not measured in this study including the lack of available alternative employment opportunities (Meyer & Allen, 1991) and magnitude or number of investments lost in leaving the organization (Rusbult & Farrell, 1983) may impact upon the results. Future research taking into account these variables would therefore be useful. Clearly, there is a need for greater analysis of the organizational and human resources factors identified. For example, other aspects of the work environment other than those that were measured in this study, such as formalization, role ambiguity, and instrumental communication should be examined.

Furthermore, the study only examined the additive effects of the bundles, perhaps the interactive effects of the practices would provide a better and more fine-grained understanding of the interrelationships among these variables which would serve to illuminate and provide further insights for academics and practitioners. Previous research has indicated that commitment is linked to lower turnover rates (Mowday et al., 1982; Steers, 1977), and increased intention to stay with the firm (Singh & Schwab, 2000). Therefore, further studies examining this notion would also be useful. It is important to note that this study only examined a small range of industries, Future research will need to confirm to what degree the link between organizational and HR practices with commitment exists for other industries.

In conclusion, this study provides a useful platform from which to test the complex issues underlying the retention of vital staff through HR practices. The study goes some way in promoting high performance strategic human resource management practices which focus on selection, remuneration and recognition strategies as means of improving commitment to the organization. This study did reveal that these practices above traditional career management programs may assist in retaining vital staff. This is an important finding in combating the effect of the current skills shortages as organizations battle to get the most from their existing people. Strategic human resource management may then be able to tip the balance towards being perceived as a business partner.

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BIOGRAPHY

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GENERALISTS, SPECIALISTS: WHO GET TO THE TOP

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ABSTRACT

This paper tries to analyze the three aspects of hierarchy: (1) generalists or specialists: which should get to the top? (2) How many agents should get to the top? (3) Can the agents who should be at the top in the optimal hierarchy really get to the top? Using a T-period model with promotion, the paper finds that the optimal hierarchy form depends on the size of the externality of coordinating multiple assets by generalists. How many agents should be at the top depends on the elasticity of the externality of coordinating multiple assets. Finally, promotion opportunity gives agents who should at the top more incentive to exert effort, and thus are more likely to get promoted.

KEYWORDS: hierarchy, incentive, promotion, promotion opportunities, generalists, specialists

JEL: D23, D01, L23, M51

INTRODUCTION

This paper aims to identify which hierarchy form should be employed by a certain firm. In this paper, I will study three aspects of hierarchy forms: (1) generalists or specialists, which type should get to the top? (2) How many agents should get to the top? (3) Can the agents who should be at the top really get to the top? The first two aspects deal with the design of optimal hierarchy form, and the third aspect verifies the feasibility of the optimal hierarchy form. The model is suitable for large corporations rather than small owner-managed firms.

The paper defines hierarchy form in terms of authority as in Aghion and Tirole (1997) and Hart and Moore (2005); i.e., the upper-level agent has authority over his subordinates, the lower-level agents. The special feature of this paper is involving incentives in the hierarchy design. Thus, the paper considers not only the ex ante incentive, but also the ex post efficiency. With a T-period model, using backward induction, the paper tries to analyze all the three aspects of hierarchy mentioned above.

The paper is motivated by the broadly observed phenomenon that fresh graduates first work at entry levels, and within several years, some of them are promoted while others are not. Generalists and specialists differ in potential productivity, which is unobservable and non-contractible at the time of hiring. Specialists can learn the specialties from experience and have a higher productivity in working with single asset than a generalist after the initial period. Generalist cannot accumulate specialty experience, but he will have a higher productivity in coordinating multiple assets than a specialist after familiar with the working environment in the initial period. Only two hierarchy forms are considered, pyramid form (generalists at the top) and inverted pyramid form (specialists at the top).

Who should be at the top depends on the size of the externality of coordinating multiple assets. If the size of the externality is large, generalist at the top is desirable; if it is small, specialist at the top may be desirable. The optimal number of the agents at the top depends on the optimal span of control that depends on the elasticity of the externality of coordinating multiple assets. In the pyramid form, if the size of the externality is very sensitive to the number of the assets, i.e., if the elasticity of the externality is large, the span of control should be large, and optimally there should be fewer generalists at the top; otherwise, more agents should be at the top. Finally, the T-period model with promotion can give agents who should at the top more incentive to work harder and thus are more likely to be promoted to the top.

The paper is organized as follows. In Section 2, I will review the recent literature on hierarchy. Section 3 introduces the model and assumptions. Section 4 analyzes who should get to the top. Section 5 analyzes

how many agents should get to the top. Section 6 analyzes the initial period and discusses the incentive of getting to the top. Section 7 is conclusion.

LITERATURE REVIEW

Hierarchy has become a hot issue since the internal organization of the firm has attracted more attention of not only the scholars in management science but also economists. Many scholars argue that hierarchy is indispensable in large organizations. The authority system provided by hierarchical structure makes it possible that unambiguous accountability is preserved in organizations with large numbers of people (Jacques, 1990). In addition, hierarchical structure plays an important role in processing information by decomposing large organizations into small information processing units (Williamson, 1985).

Generally, hierarchy has been modeled in two ways. In one way, the firm is defined as the owner of a set of assets, and it authorizes agents the right to use these assets. Each asset represents a decision on the use of the asset. Thus, in this framework, hierarchy can be interpreted as a sequence of commands over assets. For a subset of the assets k, the most senior agent exercises authority, unless he delegates the authority to the next agent(s) in the sequence. Aghion and Tirole (1997) study delegation in a setting where two agents, a boss and his subordinate, have incongruent objectives. They argue that delegation involves a tradeoff between increase in subordinate's incentive and cost of loss of control. Hart and Moore (2005) study the optimal hierarchical structure given that coordinators and specialists have different tasks. Based on certain assumptions, they conclude that coordinators should be senior to specialists, "crisscross" hierarchies are never optimal, and the optimal hierarchy is a pyramid form under certain condition.

Another way of modeling hierarchy treats the firm as an information processor, and it solves tasks by collecting, communicating and confirming information. In this framework, hierarchy can be interpreted as the locus of the communication of the information. New information is acquired and processed at the lower level and then transferred upstream to the boss, while the command of the boss is passed downstream to the lower-level agents. However, communication is imperfect and costly, not only because communicating and absorbing new information cost time, but because information may be contaminated or lost in the communication process. The cost of communication depends on the nature of the information. "Specific knowledge" is more costly to transfer than "general knowledge" (Jensen and Meckling, 1992). Thus, there is a tradeoff between specialization and communication. Bolton and Dewatripont (1994) argue that if the returns to specialization outweigh costs of communication, it is efficient for several agents to collaborate within a firm. Jensen and Meckling (1992) also argue that it is desirable for groups of individuals to exercise decision rights jointly because of bounded rationality (an individual has limited mental capability) and the inalienability of rights within an organization.

THE MODEL

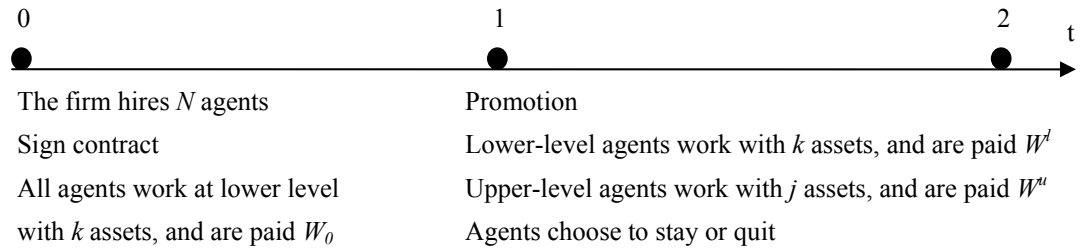
The model is a T-period internal labor market model. The organization form is a "hierarchy over assets", which is contractible ex ante at the beginning of period 1. The hierarchy modeling is in spirit of Hart and Moore (2005): there is a chain of commands over each asset, and the most senior person with 'an idea' exercises authority over the asset. In more detail, in the hierarchy, if the most senior agent who is senior to others on all of his working assets has an idea, then he can exercise his idea and generates value, while any agents who work with any of these assets and junior to him cannot exercise their idea even though they have one. On the other hand, if the most senior agent does not have an idea on the assets, he will pass the authority to his subordinates, the lower-level agents.

Assume there are n assets in a firm. The size of n depends on the size of the firm that is assumed exogenous. Assets are identical; each single asset can produce the same value $V(1)$, and any combination of $k > 1$ assets can produce the same value $V(k)$. In period 1, the firm hires N agents, both generalists and specialists, in the competitive external labor market. By signing contract, the firm commits ex ante to promoting Q_0 percentage of agents in period 2.

Generalists and specialists differ in potential productivity, but among the same type, agents are identical. Assume asymmetric information at hiring, so that the firm does not know agents' types in period 1, while each agent knows his own type. Because of the lack of information about agents' types, the firm has to treat all the agents in the same way in period 1. Assume in period 1, all newly hired agents are treated as lower-level agents. Each agent will work on a set of assets consisting of $k = n/N$ assets, and will be paid the same wage, W_0. With effort level e_1, an agent can generate value $V(k)$ with probability $P(e_1, k)$. This is referred as "an agent has an idea" (Hart, Moore, 2005). Effort is unobservable, but the value generated is observable.

At the beginning of period 2, Q_0 percentage of agents with the highest value generated will be promoted to the upper level in the hierarchy and they will have authority over a different set of assets consisting of j assets. The others who do not get promoted will stay at the lower level and still have authority over k working assets. In period 2, the upper-level agents are paid W^u, and lower-level agents are paid W^l; both W^u and W^l depend on the performance of the agents. An agent can choose to quit or stay at the beginning of period 2. The time line is shown in figure 1. By repeating this hire-promotion process for H periods, the optimal hierarchy form will be achieved and stable.

Figure 1: Time Line



The advantages of the proposed contract are as follows. In period 1, since the firm does not know agents' types, there is a hidden information problem. By providing a promotion opportunity, the principal can give agents incentive to reveal their types. In period $t \geq 2$, since effort level is unobservable and non-contractible, there is a hidden action problem (moral hazard). However, since the hierarchy is formed, and each agent has been allocated to the proper position, payment based on performance could be an effective and fair way to give agents incentive.

Types and Productivities

Specialists and generalists differ in term of their potential productivities. In period 1, all agents have the same productivity. With effort level e_1, an agent can generate value $V(k)$ from k assets with probability $P(e_1, k)$. Since period 2, a specialist has accumulated the specialties from period 1 and has a higher productivity in working with a single asset than a generalist. Therefore, in period $t \geq 2$, with effort level e_t, $P^s(e_t, 1) > P^g(e_t, 1)$ (the superscripts s and g stand for specialist and generalist respectively, and the subscripts t stands for the time period). A generalist cannot accumulate specialty experience, but he will have a higher productivity in coordinating multiple assets than a specialist after familiar with the working environment in period 1. Therefore, in period $t \geq 2$, with effort level e_t, $P^g(e_t, k) > P^s(e_t, k)$, for any $k > 1$. Assume that there is no more productivity improvement after period 2.

Preferences

Assume that all agents are risk neutral and live for T periods, $T \geq H$. Each agent has reservation utility $\bar{u}$, and he maximizes his expected utility, which is a linear function of the total expected income net of the cost of effort. For simplicity, assume no discounting (relaxing this simplification will not affect the results).

Assume that the probability of being promoted for an agent is Q. Then, the total expected wage income of an agent i is:

$$E(W^i) = W_0 + \sum_t [\, QW^u + (1 - Q)\, W^l], \quad i = g, s \tag{1}$$

And the expected utility of an agent i is:

$$E(U^i) = E(W^i) - C(e^i{}_1) - \sum_t [\, Q\, C(e^{ij}{}_t) + (1 - Q)\, C(e^{ik}{}_t)], \quad i = g, s \tag{2}$$

where k and j are the number of assets a lower-level agent and an upper-level agent have authority over, respectively.

The firm is risk neutral. The firm's object is twofold. First, firm wants to choose the optimal hierarchy form that can maximize the expected profit. Second, firm wants to hire and promote the proper agents to realize such a hierarchy.

Other Assumptions

Assumption (1)*:* Probability of generating value is a function of type i, effort level e, and number of working assets k; $P^i(e, k) \in [0, 1]$ is increasing and concave in e, and decreasing and convex in k.

$P^i{}'_e(e, k) > 0, P^i{}''_{ee}(e, k) < 0, P^i{}'_k(e, k) < 0, P^i{}''_{kk}(e, k) < 0, P^i{}''_{ek}(e, k) > 0$

The intuition is that each agent has bounded rationality. Given that each agent has limited time and energy, working with more assets requires the agents process more information, and thus lower the probability of generating idea at each effort level. Effort increases the probability of generating idea, but has diminishing returns.

Assumption (2): Cost of effort $C(e)$ is increasing and convex in e.

$C'(e) > 0, C''(e) > 0$

Assumption (3)*:* The value of k assets, $V(k)$, is an increasing and convex function of k.

$V'(k) > 0, V''(k) > 0$

It can be interpreted as a positive externality of working with multiple assets; that is, there is increasing returns to scale of assets worked together by one agent.

Assumption (4)*:* The expected value function $P(e_t\,, k)V(k)$ $(t \geq 2)$ is concave in k for generalists and decreasing in k for specialists.

From the assumption (4) and the assumption on the types and productivities, one can conclude that in the optimal hierarchy, generalists who have higher probabilities of having ideas on multiple assets and can generate higher expected values from multiple assets should actually work on multiple assets. In contrast, specialists who have higher probabilities in having ideas on individual assets and can generate higher expected values from individual assets should work on individual assets.

Assumption (5)*:* Assume there are only two hierarchy levels, an upper level and a lower level.

Optimal Wages and Incentive of Delegation

Before proceeding to the hierarchy form, let us look at the optimal wage payments for the agents in hierarchy in period $t \geq 2$. Effort level is unobservable, but since agents are risk-neutral, the wage payment schedule that makes agents the residual claimants can elicit the first best effort level as if there were no moral hazard problem. If the agent is at the upper level, he is in charge with the hierarchy composed of himself and his subordinates, and then he should be the residual claimant of the value generated by the hierarchy, so he gets

$$W^u = P(e, j)V(j) + \frac{j}{k}[1 - P(e, j)]P(e, k)V(k) - a \qquad \frac{j}{k} > 0 \text{ , } a \text{ is a constant} \tag{3}$$

If the agent is at lower level, then he is the residual claimant of the value generated by himself, and he gets

$$W^l = [1 - P(e, j)]P(e, k)V(k) - b \qquad b \text{ is a constant} \tag{4}$$

Furthermore, if a and b are chosen such that it gives the agent an expected utility same as the reservation utility $\bar{u}$, then the principal will get the same expected profit as if there were no moral hazard problem. It is worth to note that this wage payment schedule implies that the upper-level agents have incentive to monitor his subordinates, though I do not model monitoring explicitly.

In addition, this wage payment schedule makes sense of the incentive of delegation. If the upper-level agent does not "have an idea", then delegating the authority right to his subordinates can increase the potential value generated by the hierarchy, and this potentially increases his own wage payment. Thus, in this model, unlike Hart and Moore (2005), the delegation decision is endogenized in the model. The upper-level agent will always delegate authority to his subordinates if he does not have an idea.

WHO SHOULD GET TO THE TOP

I will focus on two kinds of hierarchy forms, pyramid form (generalists at the top) and inverted pyramid form (specialists at the top). Crisscross form such as matrix form is not considered here. As Hart and Moore (2005) argued, "crisscross form is never optimal" under the assumption that generalist is not a multifaceted specialist who have ideas about small subsets of the assigned working assets. This is also true here, because of the assumption of positive externality of coordinating assets.

Using backward induction, solve the model starting from period $t \geq 2$. The optimal hierarchy form is the one that maximizes the firm's expected profit. Since agents are identical among the same type, the optimal hierarchy is symmetric. For simplicity, we look at the following two hierarchy forms.

Definition: *Hierarchy form gss* is a pyramid form of hierarchy where a generalist is at the upper level and two specialists are at the lower level (the left one in figure 2).

Definition*: Hierarchy form ssg* is an inverted pyramid form of hierarchy where two specialists are at the upper level and a generalist is at the lower level (the right one in figure 2).

Figure 2: Hierarchy Forms

In the optimal contract, the firm sets two pairs of effort-wage in period $t \geq 2$, to maximize his expected profit subject to the agents' participation constraints and incentive compatibility constraints. Under the hierarchy form gss, the firm's problem is:

$$\max_{a,\,b} E\pi_{gss} = P^{g2}(e^{g2}, 2)V(2) - W^{u} + 2[1 - P^{g2}(e^{g2}, 2)]P^{s1}(e^{s1}, 1)V(1) - 2W^{l} \tag{5}$$

subject to:

$$E(U^{g}) = W^{u} - C(e^{g2}) = P^{g2}(e^{g2}, 2)V(2) + [1 - P^{g2}(e^{g2}, 2)]P^{s1}(e^{s1}, 1)V(1) - a - C(e^{g2}) \geq \bar{u} \tag{6}$$

$$E(U^{s}) = W^{l} - C(e^{s1}) = [1 - P^{g2}(e^{g2}, 2)]P^{s1}(e^{s1}, 1)V(1) - b - C(e^{s1}) \geq \bar{u} \tag{7}$$

$$\max_{e} E(U^{g}) = P^{g2}(e^{g2}, 2)V(2) + [1 - P^{g2}(e^{g2}, 2)]P^{s1}(e^{s1}, 1)V(1) - a - C(e^{g2}) \tag{8}$$

$$\max_{e} E(U^{s}) = [1 - P^{g2}(e^{g2}, 2)]P^{s1}(e^{s1}, 1)V(1) - b - C(e^{s1}) \tag{9}$$

In this section, the subscript t is ignored because we are considering a single period $t \geq 2$ in this section. Eq. (6) and (7) are the agents' participation constraints, and eq. (8) and (9) are the agents' incentive compatibility constraints. Since the monotone likelihood ratio property holds under the assumptions, one can replace eq. (8) and (9) with their corresponding first-order conditions.

$$P^{g2}{}'(e^{g2}, 2)[V(2) - 2\,P^{s1}(e^{s1}, 1)V(1)] = C'(e^{g2}) \tag{10}$$

$$P^{s1}{}'(e^{s1}, 1)[1 - P^{g2}(e^{g2}, 2)]V(1) = C'(e^{s1}) \tag{11}$$

Eq. (10) and (11) give the optimal effort levels, $e^{g2}*$ and $e^{s1}*$. The comparative statics of eq. (10) suggest that the reaction function of the generalist is downward sloping; that is, the generalist's effort is decreasing in the specialist's effort. The same is true for the specialists; the specialist's effort is decreasing in the generalist's effort.

An agent will accept the contract as long as it gives him an expected utility of at least $\bar{u}$. At the optimal, eq. (8) and (9) are binding. Substitute the optimal efforts in eq. (8) and (9), one will get the optimal $a*$ and $b*$.

$$a* = P^{g2}(e^{g2}*, 2)V(2) + [1 - P^{g2}(e^{g2}*, 2)]P^{s1}(e^{s1}*, 1)V(1) - C(e^{g2}*) - \bar{u} \tag{12}$$

$$b* = [1 - P^{g2}(e^{g2}*, 2)]P^{s1}(e^{s1}*, 1)V(1) - C(e^{s1}*) - \bar{u} \tag{13}$$

Substitute e^{g2}*, e^{s1}*, a* and b* in eq. (5), the optimal expected profit of the firm becomes

$$E\pi_{gss}^* = P^{g2}(e^{g2}*, 2)V(2) + 2[1 - P^{g2}(e^{g2}*, 2)]P^{s1}(e^{s1}*, 1)V(1) - C(e^{g2}*) - 2C(e^{s1}*) - 3\bar{u} \quad (14)$$

Under the hierarchy form *ssg*, firm's problem is:

$$\max_{a, b} E(\pi_{ssg}) = 2\,[P^{s1}(e^{s1}, 1)V(1) - W^{u}] + [1 - P^{s1}(e^{s1}, 1)]^2\, P^{g2}(e^{g2}, 2)V(2) - W^{l} \quad (15)$$

subject to:

$$E(U^{g}) = W^{l} - C(e^{g2}) = [1 - P^{s1}(e^{s1}, 1)]^2 P^{g2}(e^{g2}, 2)V(2) - b - C(e^{g2}) \geq \bar{u} \quad (16)$$

$$E(U^{s}) = W^{u} - C(e^{s1}) = P^{s1}(e^{s1}, 1)\, V(1) + (1/2)\,[1 - P^{s1}(e^{s1}, 1)]^2 P^{g2}(e^{g2}, 2)V(2) - a - C(e^{s1}) \geq \bar{u} \quad (17)$$

$$\max_{e} E(U^{g}) = [1 - P^{s1}(e^{s1}, 1)]^2 P^{g2}(e^{g2}, 2)V(2) - b - C(e^{g2}) \quad (18)$$

$$\max_{e} E(U^{s}) = P^{s1}(e^{s1}, 1)V(1) + (1/2)\,[1 - P^{s1}(e^{s1}, 1)]^2 P^{g2}(e^{g2}, 2)V(2) - a - C(e^{s1}) \quad (19)$$

Eq. (16) and (17) are the agents' participation constraints, and eq. (18) and (19) are the agents' incentive compatibility constraints. The first-order conditions of eq. (18) and (19), eq. (20) and (21), give the optimal effort levels, e^{s1}* and e^{g2}*.

$$P^{s1}{}'(e^{s1}, 1)\{V(1) - [1 - P^{s1}(e^{s1}, 1)]P^{g2}(e^{g2}, 2)V(2)\} = C'(e^{s1}) \quad (20)$$

$$P^{g2}{}'(e^{g2}, 2)[1 - P^{s1}(e^{s1}, 1)]^2 V(2) = C'(e^{g2}) \quad (21)$$

Similar to the gss form, the comparative statics of eq. (20) suggest that the reaction function of a specialist is downward sloping; that is, the specialist's effort is decreasing in the generalist's effort. The same is true for the generalist; the generalist's effort is decreasing in the specialist's effort.

At the optimal, eq. (16) and (17) are binding. Substitute the optimal efforts into the binding eq. (16) and (17), one will get the optimal a* and b*.

$$a^* = P^{s1}(e^{s1}*, 1)\, V(1) + (1/2)[1 - P^{s1}(e^{s1}*, 1)]^2 P^{g2}(e^{g2}*(e^{s1}*), 2)V(2) - C(e^{s1}*) - \bar{u} \quad (22)$$

$$b^* = [1 - P^{s1}(e^{s1}*, 1)]^2 P^{g2}(e^{g2}*(e^{s1}*), 2)V(2) - C(e^{g2}*(e^{s1}*)) - \bar{u} \quad (23)$$

Substitute e^{s1}*, e^{g2}*, a* and b* in eq. (15), the optimal expected profit of the firm becomes

$$E\pi_{ssg}^* = 2P^{s1}(e^{s1}*, 1)\, V(1) + [1 - P^{s1}(e^{s1}*, 1)]^2 P^{g2}(e^{g2}*(e^{s1}*), 2)V(2) - 2C(e^{s1}*) - C(e^{g2}*(e^{s1}*)) - 3\bar{u} \quad (24)$$

Lemma 1*:* Under both hierarchy forms, the reaction curves of the upper-level agents and the lower-level agents are downward sloping. That is, under both hierarchy forms, increase in generalist's effort will reduce the specialist's effort, and vice versa.

Proof: See the argument above.

qed.

The finding in Lemma 1 is consistent with Aghion and Tirole (1997): centralization harms the incentive of the agents at lower level; that is, the effort of the upper-level agents will crowd out the effort of lower-level agents. Thus, there is a tradeoff between incentive at lower level and loss of control, since the lower-level agents and the upper-level agents have different decision on the use of the assets. However, as discussed before, in the case of having no idea, upper-level agents will always want to delegate. In addition, the model here is different from the model in Aghion and Tirole (1997) in two senses. First of all, in the model

here, both upper-level and lower-level agents are treated as "agent" in an agent-principal problem, and the "principal" is the firm, the one who constructs the hierarchy. Nevertheless, in Aghion and Tirole (1997), the upper-level agent acts as the "principal", and the lower-level agent acts as the "agent". Secondly, in the model here, the expected income of a lower-level agent only depends on the expected value he generated by his own, but in Aghion and Tirole (1997), the expected income of a lower-level agent not only depends on the expected value he generated by himself, but also depends on the principal's expected value generated.

Lemma 2: Given the optimal effort-wage pairs, a generalist will choose (e^{g2}*, a*) and a specialist will choose (e^{s1}*, b*) under gss form, and a generalist choose (e^{g2}*, b*) and a specialist will choose (e^{s1}*, a*) under ssg form.

Proof: Because the participation constraints are binding, (e^{g2}*, a*) for a generalist and (e^{s1}*, b*) for a specialists satisfy equality of eq. (4) and equality of (5) under gss form. Under the assumption of types and productivities and assumption (4), $P^{s2}(e^{g2}*,k) < P^{g2}(e^{g2}*,k)$, $P^{g1}(e^{s1}*,1) < P^{s1}((e^{s1}*,1)$. Thus ($e^{g2}$*, a*) will give a specialist negative expected utility; and (e^{s1}*, b*) will give a generalist negative expected utility; and therefore a generalist will never choose (e^{s1}*, b*) and a specialist will never choose (e^{g2}*, a*) under gss form. Similarly, one can prove that under ssg form, a generalist will always choose (e^{g2}*, b*) and a specialist will choose (e^{s1}*, a*).

qed.

Proposition 1: If the gain of coordinating assets by the generalist is large, the hierarchy form gss is optimal; otherwise, the hierarchy form ssg is optimal.

Proof: Subtract eq. (14) by eq. (24), one gets:

$$\begin{aligned} E\pi_{gss}* - E\pi_{ssg}* = {} & \{P^{g2}(e^{g2}{}_{gss}*,2) - [1-P^{s1}(e^{s1}{}_{ssg}*, 1)]^2 P^{g2}(e^{g2}{}_{ssg}*(e^{s1}{}_{ssg}*), 2)\}V(2) - [C(e^{g2}{}_{gss}*) - \\ & C(e^{g2}{}_{ssg}*(e^{s1}{}_{ssg}*))] - 2\{P^{s1}(e^{s1}{}_{ssg}*, 1) - [1 - P^{g2}(e^{g2}{}_{gss}*, 2)]P^{s1}(e^{s1}{}_{gss}*(e^{g2}{}_{gss}*), 1)\} \\ & V(1) + 2[C(e^{s1}{}_{ssg}*) - C(e^{s1}{}_{gss}*(e^{g2}{}_{gss}*))] \end{aligned} \quad (25)$$

It is trivial to show that the first part (first two lines) of the right-hand side of eq. (25) is positive, and the second part (last two lines) is negative. Therefore, if the first part is larger than the second part, i.e., the gain of coordinating multiple assets by the generalist is large, then the generalist should be at the top, and the gss form is optimal; otherwise, the specialists should be at the top, and the ssg form is optimal.

qed.

The intuition of Proposition 1 is that since the effort of an upper-level agent will crowd out the effort of the lower-level agents as shown in Lemma 1, if the potential net output (net of wage payment) produced by a generalist is large, then the principal should not assign him at lower level where his effort will be inhibited. Otherwise, if the coordination is not important, then the specialist should be assigned to the upper level where he will exert a higher effort. Proposition 1 is consistent with the claim in Hart and Moore (2005). Involving incentive in hierarchy makes the necessary and sufficient condition of optimal hierarchy form much more complicated; however, unlike Hart and Moore's model, the agent at the top does not necessarily have lower probability of generating value.

HOW MANY AGENTS AT THE TOP

This section still deals with a single period $t \geq 2$ (the subscript t is ignored in this section). Assume the optimal hierarchy is a pyramid form (like the gss form), and the assumption below applies.

Assumption (6): There are n assets in the firm, and the span of control of an upper-level agent is m; i.e., an upper-level agent is senior to m lower-level agents.

The size of n depends on the size of the firm, which is assumed exogenous. The size of n may be affected by technology, market structure, and industry, but not by the hierarchy structure. Under assumptions (6), there need n/m upper-level agents and n lower-level agents in the optimal hierarchy. Firm's problem becomes

$$\max_{a,\,b} E\pi = \frac{n}{m}[P^{gm}(e^{gm}, m)V(m) - W^u] + n\{[1 - P^{gm}(e^{gm}, m)]P^{s1}(e^{s1}, 1)V(1) - W^l\} \quad (26)$$

subject to

$$E(U^g) = W^u - C(e^{gm}) = P^{gm}(e^{gm}, m)V(m) + m[1 - P^{gm}(e^{gm}, m)]P^{s1}(e^{s1}, 1)V(1) - a - C(e^{gm}) \geq \bar{u} \quad (27)$$

$$E(U^s) = W^l - C(e^{s1}) = [1 - P^{gm}(e^{gm}, m)]P^{s1}(e^{s1}, 1)V(1) - b - C(e^{s1}) \geq \bar{u} \quad (28)$$

$$\max_e E(U^g) = P^{gm}(e^{gm}, m)V(m) + m[1 - P^{gm}(e^{gm}, m)]P^{s1}(e^{s1}, 1)V(1) - a - C(e^{gm}) \quad (29)$$

$$\max_e E(U^s) = [1 - P^{gm}(e^{gm}, m)]P^{s1}(e^{s1}, 1)V(1) - b - C(e^{s1}) \quad (30)$$

The first-order conditions of eq. (29) and (30), i.e., eq. (31) and (32) give the optimal effort levels, $e^{gm}*(m)$ and $e^{s1}*(m)$.

$$P_e^{gm}{}'(e^{gm}, m)[V(m) - mP^{s1}(e^{s1}, 1)V(1)] = C'(e^{gm}) \quad (31)$$

$$P_e^{s1}{}'(e^{s1}, 1)[1 - P^{gm}(e^{gm}, m)]V(1) = C'(e^{s1}) \quad (32)$$

Substitute $e^{gm}*(m)$ and $e^{s1}*(m)$ into binding participation constraints (equation (27) and (28) with equal signs), one can get the optimal $a*(m)$ and $b*(m)$.

$$a* = P^{gm}(e^{gm}*(m), m)V(m) + [1 - P^{gm}(e^{gm}*(m), m)]P^{s1}(e^{s1}*(m), 1)V(1) - C(e^{gm}*(m)) - \bar{u} \quad (33)$$

$$b* = [1 - P^{gm}(e^{gm}*(m), m)]P^{s1}(e^{s1}*(m), 1)V(1) - C(e^{s1}*(m)) - \bar{u} \quad (34)$$

Thus, the expected profit of the firm with the optimal effort-wage pairs is

$$E\,\pi* = \frac{n}{m}[P^{gm}(e^{gm}*(m), m)V(m) - C(e^{gm}*(m))] + n\{[1 - P^{gm}(e^{gm}*(m), m)]P^{s1}(e^{s1}*(m), 1)V(1) - C(e^{s1}*(m))\} - (m + 1)\frac{n}{m}\bar{u} \quad (35)$$

The first-order condition of eq. (35) with respect to m gives the optimal span of control m*.

***Lemma 3**:* The optimal span of control is independent of the size of the firm.

Proof: The proof is trivial, as all n's are cancelled out in the first-order condition of eq. (35).

qed.

From assumption (3), there is a positive externality of coordinating multiple assets. Define the *elasticity of externality of cooperating multiple assets* as the sensitivity of potential value increased when an agent working with more assets.

$$\textit{Elasticity (externality of cooperating m assets)} = \frac{V'(m)}{\frac{V(m)}{m}} \quad (36)$$

Proposition 2*:* The more elastic the externality of cooperating is, the larger the span of control should be; otherwise, the span of control should be small.

The proof is tedious and is skipped here, but the intuition is simple. Here, the upper-level agents are generalists, and they work with multiple assets. If their cooperating effect is significant and has large impact on the value, then they should work with more assets, and the hierarchy should have larger span of control; therefore, steeper hierarchy is favorable. Otherwise, there should be small span of control, and therefore flatter hierarchy is favorable.

WHO WANTS TO GET TO THE TOP

Now go back to solve the period 1's problem. Like the previous section, this section also assumes the optimal hierarchy is a pyramid form (like the gss form), and there are n assets and the span of control of upper-level agent is m. In addition, as committed ex ante, Q_0 percentage of agents with the highest value generated will be promoted to the upper level at the beginning of period 2. Assume in period 1, all agents work with one asset, so that Q_0 percentage of agents with the higher value generated will be the same as the Q_0 percentage of agents with the higher probability of generating value.

Assume the distribution of the agents' probability of generating value in period 1 is $f_0(P)$, and the cumulative density function is $F_0(P)$. Let P^* be such that $Q_0 = [1 - F_0(P^*)]$. That is, if an agent's probability of generating value greater than P^*, he will be promoted to the upper level. P^* is endogenous, but a single agent treats P^* as a parameter. Define the distribution of $(P^* - P)$ as $f(P^* - P)$, and the cumulative density function is $F(P^* - P)$. Then for an agent who has probability P of generating value, the probability of being promoted is:

$$Q = [1 - F(P^* - P)] \tag{37}$$

The firm's problem is

$$\max E(\pi) = \pi_1 + \pi_2 + \pi_3 + \ldots + \pi_H + \pi_{H+1} + \ldots \tag{38}$$

subject to

$$W_0 - C(e^g{}_1) + F(P^* - P^{g1}{}_1((e^g{}_1, 1))\sum_{1<t\le T}[W^l{}_t - C(e^{g1}{}_t)] + [1 - F(P^* - P^{g1}{}_1((e^g{}_1, 1)))]\sum_{1<t\le T} [W^u{}_t - C(e^{gm}{}_t)] \ge \sum_{t\le T} \bar{u} \tag{39}$$

$$W_0 - C(e^s{}_1) + F(P^* - P^{s1}{}_1(e^s{}_1, 1))\sum_{1<t\le T}[W^l{}_t - C(e^{s1}{}_t)] + [1 - F(P^* - P^{s1}{}_1(e^s{}_1, 1))]\sum_{1<t\le T} [W^u{}_t - C(e^{sm}{}_t)] \ge \sum_{t\le T} \bar{u} \tag{40}$$

$$\max_e E(U^g) = W_0 - C(e^g{}_1) + F(P^* - P^{g1}{}_1((e^g{}_1, 1))\sum_{1<t\le T}[W^l{}_t - C(e^{g1}{}_t)] + [1 - F(P^* - P^{g1}{}_1((e^g{}_1, 1)))] \sum_{1<t\le T}[W^u{}_t - C(e^{gm}{}_t)] \tag{41}$$

$$\max_e E(U^s) = W_0 - C(e^s{}_1) + F(P^* - P^{s1}{}_1(e^s{}_1, 1))\sum_{1<t\le T}[W^l{}_t - C(e^{s1}{}_t)] + [1 - F(P^* - P^{s1}{}_1(e^s{}_1, 1)))] \sum_{1<t\le T}[W^u{}_t - C(e^{sm}{}_t)] \tag{42}$$

Eq. (39) and (40) are the agents' participation constraints, and eq. (41) and (42) are the agents' incentive compatibility constraints. Since the monotone likelihood ratio property holds under the assumptions, one can replace eq. (41) and (42) with their corresponding first-order conditions.

$$-C'(e^g{}_1) + F'(\bullet)P^{g1}{}_1'(e^g{}_1, 1)\sum_{1<t<T}\{[W^u{}_t - C(e^{gm}{}_t)] - [W^l{}_t - C(e^{g1}{}_t)]\} = 0 \tag{43}$$

$$-C'(e^s{}_1) + F'(\bullet)P^{s1}{}_1'(e^s{}_1, 1)\sum_{1<t<T}\{[W^u{}_t - C(e^{sm}{}_t)] - [W^l{}_t - C(e^{s1}{}_t)]\} = 0 \tag{44}$$

Proposition 3*:* Under the assumption of types and productivities, given the contract under the gss form, the generalist has more incentive to exert higher effort in period 1 and thus is more likely to be promoted.

Proof: Because of the assumption of types and productivities, in period $t \geq 2$, being at the upper level and working with m assets is more favorable for a generalist. That is, in eq. (43) and (44) (the first-order conditions of incentive compatibility constraints), $\{[W^u_t - C(e^{gm}_t)] - [W^l_t - C(e^{g1}_t)]\}$ for a generalist is relatively larger than $\{[W^u_t - C(e^{sm}_t)] - [W^l_t - C(e^{s1}_t)]\}$ for a specialist. Therefore, because of the higher marginal benefit of effort, a generalist has more incentive to exert effort and thus can have higher probability of generating value in period 1, and thus, he is more likely to be promoted in period 2.

qed.

CONCLUSION

This paper analyzes optimal hierarchy using a T-period model. Agents' types are unobservable at hiring, and their effort levels are unobservable, so there are hidden information problem and hidden action problem. Firm wants to choose the optimal hierarchy form to maximize profit and assign proper types of agents to realize the optimal hierarchy. Because the specialist can accumulate specialty of working with individual asset after period 1 and the generalist is more productive on coordinating multiple asset after period 1, in the optimal hierarchy the specialist should work with individual asset and the generalist should work with multiple assets. The optimal hierarchy form depends on the externality of working with multiple assets. If the externality is large, the generalist at the top is desirable; if it is small, the specialist at the top may be desirable. How many agents should be at the top depends on the elasticity of the externality of working with multiple assets. Given the pyramid form, if the externality of working with multiple assets is very sensitive to the number of the assets, the span of control should be large, and there are fewer generalists at the top; otherwise, more agents should be at the top. Finally, the T-period model with promotion can give the agents who should be at the top more incentive to get promoted.

The model has exogenous levels of hierarchy, and I only analyze the case where there are two hierarchy levels. Future work can extend the model to endogenize the layers of the hierarchy. If there are many hierarchy levels, then the lowest-level agents can get incentive from promotion opportunity; the highest-level agents get incentive from evaluation of performance; and any intermediate agents get incentive from both promotion opportunity and evaluation of performance.

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BUSINESS TRAINING, REASONING SKILLS, AND PHILOSOPHICAL ORIENTATION: CORRELATES OF ETHICAL DECISION-MAKING

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ABSTRACT

In today's business world it is essential that managers/employees engage in ethical thinking and behavior in making the decisions that are part-and-parcel of operating a successful business. Therefore, it would benefit businesses to understand, as much as possible, the various characteristics, influences, or factors which induce or predict ethical decision-making. This paper describes a study in which students at a mid-south USA university were used as proxies for "business-trained" persons versus "non-business-trained" persons, to explore the issue of whether a business background, i.e., training, makes a difference in the ethical decision-making of persons engaged in business situations. The major finding of the study is that "yes", in some instances, business-trained versus non-business trained persons do render statistically significant different decisions in business-oriented scenario. Reasoning skills and philosophical orientation were also examined as co-variates. Although the statistical evidence was not as strong, results indicated that reasoning skills and philosophical orientation also explain some of the variation observed in ethical decisions/judgments in business-oriented scenarios.

KEYWORDS: Ethical thinking, ethical decision making, business ethics, philosophical orientation

INTRODUCTION

Ethics can be defined as a set of standards of conduct that guide moral behavior and ethical decisions (Wood, 2002). Studies have found relationships between student characteristics and level of ethics and moral reasoning (Bligh, Thomas, & McNay, 2000). Understanding the characteristics that influence moral decision-making might benefit universities who are training students for the workforce and the businesses or companies to which they are going. In the current study the primary research question being addressed is, "Does business training, and/or reasoning skills, and/or philosophical-orientation have an influence on ethical decision-making in business related scenarios?" We survey business students versus non-business students to identify differences in decision-making behavior. We find evidence that indeed, business trained individuals do make different decisions. We conclude the paper with a call for additional research into this phenomenon.

There are four major parts to this paper. After this introduction, we discuss some related literature. Next we present a description of the subjects used and the data generated for the study. Then we describe, in detail, the various methodologies used to explore the relationships between our constructs and the results of those methodologies. And in the final section we summarize and give our conclusions, including a discussion of the limitations of this study and our suggestions for future research.

LITERATURE REVIEW

When studying business ethics, it is important to examine the factors related to the decision-making process. The literature suggests some of these factors may be external to the individual, like the type of issue being decided (Jones, 1991). Other literature suggests that personal factors, like gender (Gilligan, 1982; Dawson, 1997), personality (Perry & Kane, 1990), business training (Hanson & McCullough,

1995; Lindsay, 2002) and personal moral philosophies (Schlenker & Forsyth, 1977; Barnett, Bass, & Brown, 1994) could play a role in an individual's decision outcome.

Stevens (1993) found that business majors are different from non-business majors in their ethical rationalizations in that their ethical principles might lose out to the almighty dollar. Lindsay (2002) found that business students spend about 95% of their time learning how to maximize wealth but only half a semester in an ethics course. Hanson and McCullough (1995) found that students in the helping fields, like nursing or social work, had higher levels of altruism and higher ethical standards of conduct.

Lawrence Kohlberg (1983) developed a stage theory of moral thinking and reasoning based on Jean Piaget's work on moral judgment. At the earliest stage of development, or the preconventional stage, moral decisions are based on a fixed set of rules that people follow to be unquestionably obedient. Compliance is based on an individual's need to avoid punishment. As one moves into the conventional stage, the immediate people in a person's life become more important and social order and keeping society running smoothly are now main goals when making moral decisions. He emphasized that the main difference in the earlier stage compared to the later stage is that focus shifts from the person to society. In the last stage, the postconventional stage, one starts to think about how to make society better and questions rules and laws that they have followed up to this point to keep society running smoothly. Near the end of this stage a person may feel that civil disobedience is required to increase justice for all.

Differences in moral philosophies are also said to play a key role in ethical decision-making. Schlenker and Forsyth (1977) described two basic personal factors related to ethical decision-making. First they discussed the degree to which one accepts or rejects the idea of universal moral rules and called this relativism. A second factor, called idealism, was related to the outcome of a decision and how others may be affected. According to Forsyth, people high on relativism do not believe in moral absolutes but examine situations on a relative basis. Individuals high on idealism believe that moral actions should have positive consequences and do not believe that others should be harmed in the pursuit of a goal. Less idealistic individuals believe that sometimes other people may get harmed in the pursuit of a greater good (Forsyth, 1992).

Forsyth (1980) discussed how personal moral philosophies can be represented by one of four possible quadrants. According to Forsyth individuals can be represented by one of four ideologies depending on whether they were high or low on idealism as well as relativism. Forsyth labeled as Subjectivists those who are high on relativism and low on idealism. These people tend to consider actions based on their personal values and gains. Exceptionists believe in moral absolutes but are open to some exceptions and are low on both dimensions. Those who were high on both dimensions are labeled as Situationists, or those who reject moral universals and prefer outcomes where no one individual get hurt. Absolutists are low on relativism and high and idealism so they also believe that the best outcome can be achieved by following universal moral rules.

The current study draws on several aspects of the aforementioned prior research to address the question of whether business training, reasoning skills, and philosophical-orientation have an influence on ethical decision-making in business related scenarios. Next, we discuss the subjects and data collection methodology.

METHODOLOGY, DATA AND SUBJECTS

A survey instrument (see Appendix) was administered to a little over two hundred students at a mid-sized public university in the mid-south, USA. In terms of primary area of study, 73 respondents declared themselves business majors, and 131 declared themselves non-business majors. The business students were drawn primarily from upper-division business courses, and the non-business students were from

introductory psychology courses. Therefore, the business students represented persons with "business training" and the non-business majors were not exposed to business training. Since this was a non-experimental research design, a large sample size increased power of the analyses.

The survey consisted of five sections. Parts-I & II were composed of twenty reasoning skills questions, adapted from a Law School Admission Test (LSAT) study guide (Orton, 2001). The LSAT asks two types of reasoning questions, 1) analytical, or deducing spatial and numerical relationships from groups of conditions or statements; and 2) logical, or deriving logical conclusions and relationships from a variety of situations or passages. Ten specific questions of each type were chosen for the current study. For each respondent, the answers to the twenty individual questions were coded as either "0" = incorrect, or "1" = correct. A composite score was calculated out of the ten questions of each section.

In Part-III of the survey, fifteen short business-related ethical-decision-making scenarios were presented (University of Central Arkansas, 2007). Using a Likert scale ("0" = always acceptable, to "7" = never acceptable), respondents were asked to make judgments as to the acceptability of the actions/decisions described in the scenarios.

Part-IV of the survey, entitled "Personal Philosophy", presented to the respondents a summarized version of Forsyth's 4-quadrant model (Forsyth, 1980) of philosophical orientation. As mentioned earlier, this model categorizes people according to four group-types: 1) Subjectivists, 2) Exceptionists, 3) Situationists, and 4) Absolutists. Respondents were asked to categorize themselves as to which of these four groups most described themselves.

The last part of the survey asked for demographic questions, like major, gender, and academic classification. Various statistical methodologies were used to explore the relationship between business training, reasoning skills, philosophical orientation and ethical decision-making in business scenarios.

RESULTS

Group Differences (Business versus Non-Business) and Business Ethical Decision-Making Scenarios

The first issue addressed was whether business-trained people versus non-business trained people differ in their judgments in business related ethical decision-making scenarios. A series of independent samples t-tests was performed with the 15 business scenarios as the test variable and major, business versus non-business, as the grouping variable. The business scenarios were structured on an eight point Likert scale, with 0 = "always acceptable" and 7 = "never acceptable". The results are presented in Table 1.

It is interesting to examine the decision-making scenarios when they are separated into those that are legal versus those that are illegal. Eight scenarios are definitely or most likely illegal (scenarios 1, 2, 4, 5, 6, 8, 12, and 14); the other seven (scenarios 3, 7, 9, 10, 11, 13, and 15) are generally legal. The mean of the average business-major respondent scores for all illegal scenarios is 5.40; while the average non-business respondent score for all illegal scenarios is 4.88. The independent sample t-test comparing these two means is 3.495, which is significant (p=.001). The mean of the average business-major score for all legal scenarios is 4.29 versus 4.66 for the non-business majors. Comparing these two means produces a t-test statistic of 2.306, which is also significant (p = .023). Interestingly, the business trained people are more unforgiving, on average, of illegal actions than are the non-business people. However, the non-business people are more critical, on average, than the business people if the scenario involves an action that is legal, though ethically challenged. Notice that the order of the average total ratings, from most unacceptable to least unacceptable, is first, business majors, illegal actions (5.40); second, non-business majors, illegal actions (4.88); third, non-business majors, legal actions (4.66); and fourth, business

majors, legal actions (4.29). This order prevails in the data of this study regardless of whether one is looking at all fifteen of the decision-making scenarios, or just those scenarios that show statistically significant differences between the two groups. It should also be noted that for both groups, the business majors and the non-business majors, t-tests indicate that there is a statistically significant difference ($p \leq .001$) between their average scores for the legal scenarios versus the illegal scenarios.

Table 1: Group Differences (Business vs. Non-Business) Business Ethical Decision-Making Scenarios

	Means			
	Business	**Non-Business**	**t**	**SIGNIF**
S1	5.73	4.62	4.289	0.000**
S2	6.28	5.95	1.663	0.098*
S3	4.76	4.93	(0.741)	0.460
S4	6.26	5.95	1.545	0.124
S5	4.78	3.68	3.427	0.001**
S6	4.04	3.01	3.547	0.001**
S7	3.01	2.99	0.091	0.928
S8	5.74	5.18	1.979	0.049**
S9	5.22	5.12	0.404	0.687
S10	6.19	6.28	(0.514)	0.608
S11	3.96	4.18	(0.746)	0.457
S12	5.16	5.76	(2.119)	0.036**
S13	3.92	4.97	(3.605)	0.001**
S14	5.14	5.03	0.376	0.708
S15	2.90	4.23	(4.537)	0.000**

*Mean scores on the 15 business-related ethical-decision-making scenarios, for the business major compared with non-business major. Independent samples t-tests were performed on each scenario by major; significant differences are indicated. *Significant at Alpha ≤ 0.10, **Significant at Alpha ≤ 0.05*

The results indicate that for eight of the fifteen scenarios, the business majors gave statistically significantly different judgments than did the non-business majors. Of the statistically different judgments, the business people indicated less acceptance for the actions described in scenarios 1, 2, 5, 6, and 8 while the non-business majors felt 12, 13, and 15 were most unacceptable.

This result begs the question of whether there might be some commonality in these two groups of scenarios. To address that issue, a principal components analysis (PCA) was performed on just the eight scenarios that showed statistical significance in Table 1. An unrestricted Varimax rotation was used with PCA being the designated extraction method. A Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (.631) indicated that the eight variables were acceptable for factor analysis. Also, the Bartlett's Test for Sphericity indicated that the correlation matrix for these variables was not an identity matrix, again, an indicator of acceptable conditions for conducting a factor analysis. Results are presented in Table 2.

Table 2: Factor Analysis on Significant Business Scenarios

	Component	
Scenario	**Factor 1**	**Factor 2**
1	**0.656**	(0.092)
2	**0.532**	0.245
5	**0.747**	0.103
6	**0.676**	(0.151)
8	**0.474**	0.351
12	0.011	**0.726**
13	0.184	**0.671**
15	(0.066)	**0.799**

A Factor Analysis using a Varimax rotation was performed to reduce the 8 scenarios shown to be significantly different in table 1 into comprehensive factors. Two factors emerged and the loadings are presented here.

As seen in Table 2, the eight variables loaded onto two components, with all loadings over .500 (except for Scenario 8, whose highest loading is .474). This appears to represent a clean grouping of variables into two distinct types. But do these two distinct factors have sufficient "face validity" that we can say that they are representative of logically distinct underlying constructs? Scenario 1 involves padding expense accounts; scenario 2 entails engaging in an illegal production process in order to increase profits; scenario 5 concerns paying a bribe in order to enhance profits; scenario 6 is about suppressing competition in order to enhance profits; and scenario 8 is about insider stock trading to achieve gain. These five scenarios involve financial enrichment to either the company or an individual employed by the company. Therefore, hereafter, they will be regarded as the "financial" scenarios. On the other hand, the issues addressed by the last three scenarios are of a quite different nature. Scenario 12 has to do with gender discrimination; scenario 13 is about deceptive advertising; and scenario 15 concerns the exploitation of young women as scantily clad waitresses. These last three scenarios do not seem to have much to do with immediate money or profits. Therefore, these three scenarios will be designated as the "people" scenarios. Implications of these two types of scenarios, financial versus people, will be discussed in subsequent sections of this paper.

Group Differences (Business versus Non-Business) and Reasoning Skills

As described in the preceding section, statistical evidence suggests that business trained students may be different from non-business trained students in their business-related ethical judgments. Before coming to this conclusion, other possible underlying factors like intellect should be considered.

To explore this possibility further, chi-squares were performed on major (business & non-business) on each reasoning question (correct & incorrect). Also, two independent sample t-tests were performed between the majors on the total analytical and logical scores. The results are presented in Tables 3-A and 3-B.

Table 3-A: Group Differences (Business vs. Non-Business) Analytical Reasoning

	Means			
	Business	Non-Business	χ^2	Signif.
Q1	0.78	0.59	2.87	0.005**
Q2	0.96	0.70	4.57	0.000**
Q3	0.77	0.54	3.35	0.001**
Q4	0.84	0.68	2.47	0.014**
Q5	0.82	0.67	2.44	0.015**
Q6	0.91	0.87	0.70	0.405
Q7	0.84	0.75	1.53	0.127
Q8	0.70	0.54	2.40	0.017**
Q9	0.93	0.88	1.20	0.231
Q10	0.84	0.58	2.08	0.039**
Total Analytical	0.84	0.67	5.93	0.000**

*A Chi-square was performed on the outcome of an analytical question (correct or incorrect) by major (business or non-business). Total number correct was computed and compared with an independent samples t-test. Significant differences are indicated. **Significant at Alpha ≤ 0.05*

For seven questions of the ten questions, on both the analytical and the logical sections, major (business versus non-business) was **not** independent from reasoning skill. Of the analytical questions, 1, 2, 3, 4, 5, 8, and 10 showed statistical significance; of the logical questions, 11, 13, 14, 15, 17, 18, and 20 were statistically significant. Also, the t-test of the continuously measured TotalANALYTICAL-percent-correct (p=.000) and the TotalLOGICAL-percent-correct (p=.000) variables strongly indicated statically significant differences, business people versus non-business. The interesting thing to note is that for every question, whether statistically significant or not, the business people, on average, scored higher than

the non-business people. This is strong evidence that reasoning skills do, to some degree, delineate business people from non-business people. Whether this reasoning-skills difference permeates to help explain differences in ethical decision-making is another topic addressed later on in this paper.

Table 3-B: Group Differences (Business vs. Non-Business) Logical Reasoning

	Means			
	Business	Non-Business	χ^2	Signif.
Q11	0.80	0.68	1.89	0.061*
Q12	0.42	0.34	1.17	0.243
Q13	0.76	0.48	4.05	0.000**
Q14	0.95	0.77	3.37	0.001**
Q15	0.58	0.45	1.82	0.069*
Q16	0.35	0.31	0.62	0.539
Q17	0.84	0.49	5.21	0.000**
Q18	0.95	0.78	3.17	0.002**
Q19	0.36	0.31	0.45	0.655
Q20	0.82	0.58	3.69	0.000**
Total Logical	0.68	0.51	5.62	0.000**

*A Chi-square was performed on the outcome of a logical question (correct or incorrect) by major (business or non-business). Total number correct was computed and compared with an independent samples t-test. Significant differences are indicated. *Significant at Alpha ≤ 0.10, ** Significant at Alpha ≤ .05*

Differences Between Business Training, by Philosophy-Type

Another possible confounding factor, besides business training, that could influence ethical decision-making is philosophical background. This is, obviously, a very wide-ranging and broadly defined area, and a thorough investigation of such is well beyond the limited scope or space allotment of this paper. Forsyth's (1980) taxonomy of ethical ideologies is one example of a model of philosophical orientation. Therefore this model was used to explore whether philosophical orientation has an impact on ethical decision-making. Respondents classified themselves as to membership of the category of philosophy they most identified with. Their responses are presented in Table 4.

Table 4: Chi-Square: Business/Non-Business Verses Philosophical Type

		Major		
		Business	**Non-Business**	**Total**
Subjectivists	Count	26	29	55
	Expected Count	22.1	32.9	55.0
	Residual	3.9	(3.9)	
Exceptionists	Count	23	32	55
	Expected Count	22.1	32.9	55.0
	Residual	0.9	(0.9)	
Situationists	Count	14	24	38
	Expected Count	15.3	22.7	38.0
	Residual	(1.3)	1.3	
Absolutists	Count	9	22	31
	Expected Count	12.5	18.5	31.0
	Residual	(3.5)	3.5	
Total	**Count**	72	107	179
	Expected Count	72.0	107.0	179.0

The table shows the actual number of respondents (Business and Non-Business) falling within each of the four philosophical types. Differences between expected and observed are presented and a Chi-Square indicated these counts are not dependent of each other, so major classification was not dependent on philosophy classification.

Of the 179 total useable responses, approximately 31% classified themselves as Subjectivists, 31% as Exceptionists, 21% as Situationists, and 17% as Absolutists. The Pearson Chi-Square statistic computed to be 2.990 (p=.393). Thus, major and philosophy- type are independent of each other.

Differences in Reasoning Skills by Philosophy –Type

The previous section yielded evidence that business people do **not** differ by philosophy-type from non-business majors, and therefore philosophical orientation may not have a direct affect on ethical decision-making. But perhaps philosophy-type has an indirect affect on ethical decision-making via the route of affecting reasoning skills. The direct relationship between reasoning skills and ethical decision-making will be addressed in section 6. The results of the crosstabs between the four philosophy types and the outcome on the individual reasoning questions are presented in Table 5.

Table 5: Chi-Square of Philosophy Type by Reasoning Outcome (corrector or incorrect)

Analytical			**Logical**		
Question	χ^2	SIGNIF	Question	χ^2	SIGNIF
1	7.789	0.051*	11	6.840	0.077*
2	1.222	0.748	12	0.645	0.886
3	3.160	0.368	13	2.363	0.500
4	6.302	0.098*	14	5.589	0.133
5	4.003	0.261	15	3.662	0.300
6	0.365	0.947	16	4.200	0.241
7	3.035	0.386	17	1.080	0.782
8	8.865	0.031**	18	8.506	0.037**
9	4.726	0.193	19	8.187	0.225
10	5.723	0.455	20	15.436	0.017**

*This table summarizes the results of a chi square of whether an individual was correct/incorrect on each of the 20 reasoning questions compared to the four philosophy types. A Chi-square statistic was calculated to determine if these two variables were independent of one another. Each question was analyzed individually and significance is indicated. Significant at Alpha ≤ 0.10; **Significant at Alpha ≤ 0.05*

Table 5 shows the results of running a crosstabs of the categorically coded (0=incorrect, 1=correct) reasoning skills questions on the four-segmented philosophy-types. Note that when looking at the group of analytical-reasoning questions (Qs 1, 4, 8) and the group of logical-reasoning questions (Qs 11, 18, 20), the Chi-Square statistic indicates that in those six instances, the correctness of answers is, on average, different depending upon the philosophical orientation of the respondent. Interestingly, when run as an ANOVA (the individual reasoning questions as the DVs and philosophy-type as the IV), and looking at the contrast combinations of philosophical-type for the six reasoning questions showing statistically significant differences, they all involve the Absolutists (and sometimes the Exceptionists). For all six of the questions, these two philosophical-types answer with disproportionate incorrectness relative to the other two philosophy-types. Recall that the common definitional component of the Absolutists and the Exceptionists is that they both believe in moral absolutes. Could it be that these two types of "absolutists" are inferior in their reasoning skills? And might inferiority in reasoning skills then spill over to indirectly affect ethical decision-making? This issue will be addressed in subsequent sections of paper.

Differences in Ethical Decision-Making, by Philosophy-Type

Next, the question of whether respondents differ in their ethical decision-making depending upon philosophical orientation was addressed with a one-way ANOVA. The fifteen ethical-decision making scenarios were the criterion variables with philosophy-type designated as the independent variable. Results are presented in Table 6.

In just four of the fifteen scenarios did philosophy-type have a statistically significant impact. Of the four, only scenarios 2 and 8 also showed statistical significance when Major was the IV (See section 1). This suggests that perhaps philosophy-type has little direct influence in driving differences in respondents' ethical decision-making.

Correlations: Reasoning Skills and Ethical Decision-Making

Throughout this paper, evidence has suggested that business majors differ from non-business majors in their ethical decision-making and their reasoning abilities. The next step was to see if there is a direct correlation between reasoning skills and ethical decision-making. Bivariate correlations were performed

Table 6: Differences in Ethical Decision-Making by Philosophy-Type

Scenario	F	SIGNIF	Scenario	F	SIGNIF
1	0.785	0.504	8	2.257	0.083*
2	2.836	0.040**	9	1.061	0.367
3	0.244	0.866	10	0.267	0.849
4	2.163	0.094*	11	0.915	0.435
5	0.153	0.928	12	1.125	0.340
6	1.257	0.291	13	1.581	0.195
7	0.680	0.565	14	2.125	0.099*
			15	1.978	0.119

*The table indicates the results of an ANOVA for self-reports out of 7 (with 1 being always acceptable and 7 being never acceptable) on the 15 individual decision-making scenarios by the four-philosophy types group. Significant differences are indicated. **Significant at Alpha ≤ 0.05 *Significant at Alpha ≤ 0.10*

between the scores on the ethical decision-making scenarios and, first, the overall-percent-correct on the analytical reasoning questions and, second, on the overall-percent-correct of the logical reasoning questions. Interestingly, correlations were present between the eight key scenarios discussed earlier, with just one exception. The total analytical score correlated with scenario #4, which was not one of the eight scenarios that showed differences by major. For this reason, focus was placed on the correlations between reasoning skills and the five key financial scenarios and the three key people scenarios. Results are presented in Table 7.

In six of the eight scenarios there was a statistically significant correlation between ethical decisions and at least one type of reasoning skill. For scenarios 1, 2, 5, 6, and 8 (the "financial-oriented" scenarios), the correlations were positive and for scenarios 12, 13, and 15, (the "people-oriented" scenarios), the correlations were negative. This suggests that as the reasoning skills increase, respondents judged the ethical actions of the financial-oriented scenarios to be more unacceptable but judged the people-oriented scenarios to be more acceptable. The purpose of this paper is not to claim that those with better reasoning skills would find the financial scenarios unacceptable and the people scenarios as acceptable; however this pattern might be suggestive of something systematic linking the association between reasoning skills and ethical decision-making. Further investigation is warranted.

Table 7: Correlations: Reasoning Skills with Ethical Decision-Making

	Correlation Coefficient			Correlation Coefficient	
Business Scenario	Analytical Reasoning	Logical Reasoning	Business Scenario	Analytical Reasoning	Logical Reasoning
1	0.278*	0.174*	8	0.125	
2	0.178*	0.123	9		
3			10		
4			11		
5	0.125	0.197*	12		(0.126)
6	0.184*	0.167*	13		(0.178)*
7			14		
			15	(0.167)*	(0.164)*

*This table shows Pearson-correlations (one-tailed) between individual rankings out of 7 on the ethical business decision-making scenarios, paired with percent correct on the 10 analytical questions and then paired with the percent correct on the 10 logical questions. Only the 8 scenarios found to be significant in Table 1 were considered in this analysis. *Significant at 0.10*

Regressions

It appears that all three of the research constructs of business training, reasoning skills, and philosophical-type do have some impact on ethical decision-making. There is, however, some degree of multicollinearity amongst the three constructs, suggesting that analyses should be conducted to determine how much influence each have on ethical decision-making. To answer this final question, regression analyses were performed with each of the eight ethical scenarios previously determined to be significant as criterion variables and analytical-reasoning-percent-correct, logical-reasoning-percent-correct, philosophy-type, and major as predictors. Results are presented in Table 8.

Table 8: Results of Regressions

		Standardized Beta Weights			
	(F-test)	***(t -test for independent variables coefficients)***			
Scenario	R^2	Analytical	Logical	Phil-Type	Training
1	0.180*	**0.314***	(0.013)	0.167**	(0.191)**
	(9.559)	*(3.678)*	*(-.156)*	*(2.360)*	*(-2.493)*
2	0.080*	**0.244***	0.055	0.094	(0.015)
	(3.758)	*(2.698)*	*(.621)*	*(1.255)*	*(-.186)*
5	0.077*	0.083	0.104	0.023	**(0.168)****
	(3.640)	*(.917)*	*(1.155)*	*(.304)*	*(-2.063)*
6	0.082*	0.089	0.055	(0.042)	**(0.194)****
	(3.891)	*(.986)*	*(.612)*	*(-.567)*	*(-2.396)*
8	0.039	0.083	(0.028)	0.111	**(0.143)*****
	(1.765)	*(.903)*	*(-.309)*	*(1.459)*	*(-1.728)*
12	0.037	0.102	**(0.145)**	(0.001)	0.137***
	(1.668)	*(1.103)*	*(-1.574)*	*(-.018)*	*(1.646)*
13	0.103*	0.184**	(0.177)**	0.093	**0.248***
	(4.981)	*(2.067)*	*(-1.994)*	*(1.264)*	*(3.102)*
15	0.077*	0.000	(0.058)	0.065	**0.232***
	(3.573)	*(.003)*	*(-.637)*	*(.860)*	*(2.832)*

*The table shows the results of separate regressions with each of the significant ethical business decision-making scenarios from Table 1 as the dependent variable and percent correct on the 10 analytical questions, total percent correct on the reasoning questions, philosophy-type, and major as predictor variables. Significant predictors are indicated separately for each scenario. *Significant at 0.01, **Significant at 0.05, ***Significant at 0.10*

The models were not particularly strong, with the R^2, ranging from a low of .037 to a high of only .18. However, six of the eight were statistically significant. The beta weights are standardized and indicate which of our three predictors was most influential. The results indicated that overall analytical score was a significant predictor in 3 of the 8 scenarios, overall logical score in 1 of the 8, philosophy-type in 1 of the 8, and major in 7 of the 8. As far as the construct exerting the most influence, the overall analytical score had the highest standardized beta in 2 of the 8, overall logical scores had the highest in 1 of the 8, and major was most influential in 5 of the 8 scenarios.

SUMMARY AND CONCLUSIONS

To summarize, the objective of this study was to relate business training, reasoning skills, and philosophical orientation to ethical decision-making. In the first section, an initial link was made between business training and ethical decision-making in eight of the fifteen scenarios. In the next section it was found that business people scored higher on analytical and logical reasoning. In the third section business training and philosophical orientation were found to be independent of each other, but in the next section a relationship was found between philosophy-type and reasoning skills. The next sections found evidence that ethical decision-making differed by philosophical orientation and also was related to reasoning skills. Finally, due to possible intra-correlations between business training, reasoning skills, and philosophical-orientation, multiple regressions were performed with ethical decisions as the dependent variable. Business training, reasoning skills, and philosophical-orientation were loaded as independent variables.

Summarizing the primary research question: "Do business training, and/or reasoning skills, and/or philosophical-orientation have an influence on ethical decision-making in business scenarios?", it was determined that all three factors had some impact. Evidence suggested that business training, in most instances, was the pre-dominant influence, followed next by reasoning skills, and finishing with philosophical-orientation having the least influence.

An exploratory paper, such as this, naturally has several limitations. At a fundamental level, the major limitations revolve around the basic statistical notions of validity and reliability. Therefore, the issue of internal validity must be raised. Also, due to the correlational method of collection, cause and effect cannot be suggested, only trends and relationships. External validity and generalizability may also an issue. The question of whether the study has sufficient reliability (i.e., will the results replicate in duplicate studies) must also be raised. Although these problems may exist, nevertheless, the statistical significance displayed and observed in various parts of this study do indicate specific relationships do exist that are systematic and not merely random fluctuations. The evidence suggests that there is a connection between the business training, reasoning skills, and philosophical orientation, as they are operationally defined and measured here, and ethical decision-making in business related scenarios. Moreover, we do not distinguish between decisions that involve a violation of the law and those that do not violate the law.

Future research should focus on ameliorating the limitations delineated in the preceding paragraph. Particularly important is developing validated scales to measure the several constructs dealt with in this paper. Using real world business practitioners, rather than student proxies, would enhance validity for business training. Also, this area of research is critical for the development of relevant college business curriculum. In addition, distinguishing between decisions that involve a violation of the law and those that do not violate the law could provide significant additional insights into decision making behavior. Most importantly, for businesses it would be beneficial to be able to predict which people, as employees, will conduct themselves in the most ethical manner.

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APPENDIX – SURVEY INSTRUMENT

I. Analytical Reasoning

Please choose the best answer to each of the following questions. Fill in the letter on the scantron that matches your answer.

1. Eight adults are seated around the perimeter of a square table. The following conditions are true about their seating: An equal number of adults sit on each side of the table. A woman is always seated next to a man. Half of the adults are women. A woman is always seated between two men.

   Given the above facts about the seating arrangement, all of the following must be true **EXCEPT**:

   A. A man is always seated directly across from a woman.
   B. A man is seated between two women.
   C. Two men never sit in adjacent seats.
   D. People of the same sex sit directly across from each other.

2. A group of nuclear scientists have been working with six nuclear particles – AB, AQ, AZ, BM, BO, and BV. The following is known about their relative speeds: AQ is the same speed as BM. BV is 300 mph slower than BO. None of the "B" particles is faster than any of the "A" particles. AB is 400 mph faster BM.

   Given the above facts about the relative speeds of the particles, which of the following must be true?

   A. BO is faster than BV.
   B. AZ is faster than AB.
   C. BV is faster than BM.
   D. BV is faster than BO.

3. Seven groups of campers (A, B, C, D, E, F, & G) embark on a hiking expedition into the Sierra Madres. At the first sign of nightfall, the campers set up campsites around a well, as follows: Campsite A is due south of the well. Campsite B is due east of campsite A and due south of campsite C. Campsite G is west of the well. Campsite D is east of campsite C.

   How many campsites **must** be east of the well?

   A. 2
   B. 3
   C. 4
   D. 5

4. Three flags (1, 2, and 3) are to be designed using nine colors: red, orange, yellow, green, blue, indigo, violet, white, and pink. The design of the flags must not violate any of the following conditions: Each flag must contain exactly three colors. Each color must be used (but only 1 time). Flag 2 contains blue and green. Flag 3 contains yellow, but since it contains yellow it MUST ALSO contain violet. Any flag that contains yellow CANNOT contain red. A flag containing green or violet CANNOT also contain pink. Flag 1 contains indigo and orange.

   Given the above, what is the third color, besides green and blue, of flag 2?

   A. white
   B. red
   C. pink
   D. violet

5. Two self-contained teams (Alpha and Beta) work simultaneously in a factory, each team constructing the same vehicle composed of 3 separate sections: X, Y and Z. Assembly takes place on Tuesday, Wednesday, and Thursday of every week. For the week's production, each team may assemble in whatever order they choose, as long as they follow these restrictions: Each team can assemble only one section on any given day. Each unit of output contains only one of each of the three sections. Beta must assemble section Z on Thursday. Alpha must assemble section Z a day before Beta does. Alpha assembles section X on Tuesdays. Beta must assemble section Y two days before Alpha does.

   What part must Beta assemble on Wednesday?

   A. X
   B. Y
   C. Z
   D. possibly Y, but definitely NOT X

6. Two men (Ben and Arnold) and two women (Lydia and Dolly) have four different professions: dancer, magician, violinist, and salesperson, but not respectively. A game show contestant is trying to match the people with their professions. He is given the following information: Ben is not the dancer. The violinist is a woman. The dancer is not a woman. Dolly is the magician.

From the information given, the contestant can deduce that Lydia must be the

A. magician
B. dancer
C. violinist
D. salesperson

7. Tina's Doberman has a litter of six puppies. Each of the puppies is a solid color. The puppies have the following characteristics. Exactly three of the puppies have floppy ears. Exactly five of the puppies are female.

   Which of the following must be true?

   A. At least two of the females have floppy ears.
   B. Three of the females have floppy ears.
   C. One of the female puppies has floppy ears.
   D. The male puppy has floppy ears.

8. Sam is getting dressed to go to a party, but he is having trouble deciding what clothes to wear. He will not wear any color combination that does not go well together. He has … 2 pairs of slacks – brown and blue. 2 dress shirts – white and gray. 2 pairs of shoes – black and brown. Blue slacks cannot be worn with brown shoes. Gray does not go well with brown. Black does not go well with brown. Blue goes best with gray.

   Assuming that Sam can wear only one pair of shoes, slacks, and one shirt at a time, answer the following question …If Sam wears Black shoes, which of the following is true?

   A. He will wear a white shirt.
   B. He will wear brown slacks.
   C. He will wear a gray shirt.
   D. He has no combination of slacks, shirts, and shoes that meets his style requirements.

9. Within a national park, there are five ranger stations – Q, R, S, T, and U. A communications system links the stations, but messages can be sent or relayed only accordingly to the following plan: From T to Q. From Q to R and from Q to U. From S to R and from S to U. From R to S and from R to T.

   Which is the only station that CANNOT relay a message?

   A. R
   B. S
   C. T
   D. U

10. A university committee is to be made up of four members, with an equal number of men and women, an equal number of natural scientists and social scientists, and an equal number of instructors and professors. The four members are to be selected from seven people – A, B, C, D, E, F, and G. Facts about the seven people are as follows: B, C, and D are men; the others are women. A, B, and C are natural scientists; the others are social scientists. A, D, E, and G are instructors; the others are professors.

    If B and D are chosen for the committee, the women members of the committee must be…

    A. A and F.
    B. A and G.
    C. G and E.
    D. G and F.

II. Logical reasoning
Please choose the best answer to each of the following questions.

11. It is no wonder that most big cities have an increase in homeless people. Because of middle- and high-income people's renovating and settling in low-rent areas of the cities, property values have skyrocketed beyond the means of those who once lived there. If the city could decrease rent levels to previous levels, then the problem of homelessness would be virtually eliminated. Which of the following, **if true**, would most seriously **weaken** the claim that low-income housing solves the problem of homelessness?

    A. Homelessness was a problem before middle- and high-income people began renovating and settling in low-rent areas of the cities.
    B. Homeless people are eager to find affordable housing.
    C. Several respected studies indicate that as the quantity of low-income housing increases the degree of homelessness decreases.
    D. In general, homeless people are very much in favor of low-income housing.

12. Making an explosive device with dry ice is simple. Because dry ice expands as it changes from a solid to a gaseous state, the only challenge is to enclose the dry ice in an impermeable container. As the dry ice evaporates, pressure builds inside the container, which explodes with amazing force. Because people who make dry ice bombs have been known to injure themselves and others, U.S. federal law prohibits the sale of dry ice to minors.

If all of the statements in the preceding paragraph are **true**, a logical inference would be that…

A. Dry ice is not currently sold to anyone in the United States.
B. Dry ice evaporates into carbon dioxide gas.
C. Children in the United States are unable to make dry ice bombs.
D. A permeable container would not make an effective dry ice bomb.

13. Ethologists, people who study animal behavior, have traditionally divided an organism's actions into two categories: 1) learned behavior (based on experience), and 2) an instinctive behavior (based on genotype). Some current scholars reject this distinction, claiming that all behavior is a predictable interaction of genetic and environmental factors.

Which of the following statements, **if true**, **supports** the claim of these current scholars?

A. All organisms with identical genotypes and identical experience sometimes respond differently in different situations.
B. All organisms with different genotypes and identical experience always respond differently in identical situations.
C. All organisms with similar genotypes and similar experience always respond differently in identical situations.
D. All organisms with identical genotypes and identical experience always response identically in identical situations.

14. Reading is a complex physical and psychological process. Most theorists claim that people read in two ways. The first way, which usually precedes the second, is reading letter by letter. Using this process, readers process each letter individually and then mentally combine the letters to produce a word. The second way, typically used by more experienced readers, is reading on the basis of word shapes. Using this process, readers learn to recognize specific word shapes and do not need to look at each individual letter. Of course, advanced readers will use both of the processes, depending on the familiarity of the word shape. Which of the following statements can be inferred from the passage above?

A. Advanced readers have given up reading letter by letter.
B. Skillful readers rely both on the word-shape and letter-by-letter reading methods.
C. "Whole language reading," which is reading by word shapes, should only be used by people who are over age 30.
D. Beginning readers often find reading letter-by-letter more difficult than reading by word shape.

15. Eden is a metaphor for a time of paradise and perfection. Xavier: "Eden was."Yolanda: "Eden is."Zed: "Eden will be."

Which of the following **cannot** be inferred from the statements above?

A. Zed is optimistic about the future.
B. Xavier, Yolanda, and Zed may disagree about some things.
C. Yolanda and Xavier completely disagree.
D. Yolanda views the present positively.

16. Traveler says: "The only airline that I will ever fly is Acme Air because they have never had an accident in their entire three years of operation. The argument above logically depends on which of the following assumptions?

A. Acme Air flies to all the cities that the traveler wants to visit.
B. Acme's safety record is a matter of random fluctuation.
C. Acme's record of service sufficiently predicts continual safety for future flights.
D. Other airlines with a similar number of flights have had one or more crashes in the last three years.

17. To apply for a job at a certain semiconductor plant in Boise, Idaho, a person must either have a bachelor's degree in engineering or an associate's degree in a science-related field. To be hired for an entry level position, applicants with an associate's degree must also have at least five years of work experience. An applicant with similar work experience as well as a bachelor's degree in engineering is considered over-qualified for entry level work and can be hired only in a management position.

If all of the above are **true**, which of the following **must also be true**?

A. A new entry-level employee with five years of work experience will not hold a bachelor's degree in engineering.
B. The plant in Boise receives more applications from people with associate's degrees than with bachelor's degrees.
C. Work experience is all that matters when the position to be filled is management.
D. Most applicants with associate's degrees are hired at management level.

18. Carnivore says: "Meat is high in protein. We need to eat meat protein to help our muscles grow. Vegetarian says: "Your muscles don't need meat in order to grow. Just look at gorillas. They never eat meat, and their muscles are enormous. This proves that you can get all the protein you need without eating meat."

Which of the following statements, **if true**, would most likely **weaken** the vegetarian's argument?

A. The top body builder in 2000 was a strict vegetarian.
B. Several respected studies show that non-meat-eating mammals get all the muscle building nutrients they need from eating vegetation.
C. Gorillas like to eat bananas.
D. Gorillas metabolize vegetation in a different way than do humans.

19. The benefits of psychotherapy result not only from the advice that the therapist gives but also from the supportive relationship offered the patient. Even though this relationship may cost large amounts of money over the years, most patients interpret the therapist's concern for them as genuine and identify this caring relationship as the primary factor in improving their mental health. However, recent studies have found that only eight percent of therapist/patient relationships continue after the patient terminates formal paid visits.

    If the statements above are **true**, then it **must also be true** that…

    A. Therapists are in fact more concerned with moneymaking than their patients' well-being.
    B. If therapy consists solely in reading a book, an important healing element will be missing.
    C. Patients think that therapists, in general, are money-hungry and greedy.
    D. Therapists who terminate relationships are likely to benefit the mental health of their patients.

20. Unlike retail outlets where items are purchased in single units, club warehouse products are grouped in bulk packages usually consisting of a dozen units or more. This quantity buying offers savings to the customer. The option to take advantage of wholesale prices by buying in bulk makes club warehouse stores a practical choice for budget-conscious consumers.

    Which of the following is an assumption necessary to the author's argument?

    A. Club warehouse stores often have smaller buying power and lower overhead costs, so they offer a greater variety of products than regular retail outlets.
    B. Club warehouse store are often less conveniently located but have better parking facilities.
    C. The emergence of club stores has caused many retail stores to flourish and thus eliminates competition for customers.
    D. The financial savings from purchasing bulk packages may outweigh the inconvenience of being unable to purchase single items.

III. Ethical Acceptability

In the context of your personal ethical standards please rate (i.e., circle one number) on the Likert scales following each of the following situations.

1. An executive earning $75,000 a year added personal expenses to his business expense account of $2,000 a year.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7
****

2. In an effort to increase profits, a manager used a production process which exceeded legal limits for environmental pollution.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7
****

3. Because of her company's strong suggestions, a stockbroker recommended an investment that she, herself, did not consider to be a good investment.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7
****

4. A small business received one-third of its gross revenues in the form of cash. The owner reported only one-half of the cash receipts as income for income tax purposes.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7
****

5. A contract representative paid a $500,000 to a manager of another company. In return, the manager promised assistance in obtaining a contract which produces $10,000,000 in profit for the contractor's company.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

6. A government contractor disliked the very strong competition created by the bidding process for government purchases. He,therefore, reached an understanding with other major contractors to allow bidding which would provide a reasonable profit.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

7. A sales representative continued the tradition of sending expensive gifts to purchasing agents to maintain their business.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

8. A corporate director of a major pharmaceutical company learned of a product recall. On the basis of this information, he sold his stock at a gain before the announcement was made public.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

9. A VP of Personnel promoted a loyal friend and competent manager to the position of marketing director in preference to a better-qualified manager with whom he had no close relationship.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

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10. An aerospace engineer discovered what she perceived to be a product design flaw, which constituted a safety hazard. Her company declined to correct the flaw. The engineer decided to keep quiet rather than take her complaint outside the company.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

11. A financial officer used a method of financial reporting which was legal but concealed embarrassing financial facts from the public.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

12 . An employer received applications for a supervisor's position from two equally qualified applicants but hired the male applicant because she thought that some employees might resent being supervised by a female.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

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13. As part of the marketing strategy for a product, the producer changed its color and marketed it as "new and improved" even though its other characteristics were unchanged.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

14. An owner of a small firm received a free copy of a copy-righted computer software program from a friend rather than spending $500 to obtain his own program from the software dealer. He then copied and used it on multiple computers in his business.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

15. The owner of a restaurant in financial distress began hiring young, attractive, scantily clad waitresses, hoping to dramatically increase sales.

Always Acceptable **Never Acceptable**
0-------1-------2-------3-------4-------5-------6-------7

****

IV. Personal Philosophy

Below are listed four possible statements of personal philosophy. Please read them and rank them (1, 2, 3, 4) in order of personal preference, with 1 being most like you to 4 being least like you as they relate to your personal view of life. Only use the numbers once.

____A. I believe that "truth is relative" – what is "true" or "right" depends upon the specific circumstances of the situation at issue; I also believe that "the good of the whole" should take precedence over the welfare of any one individual.

____B. I believe in absolute truth – something is either "true" or "untrue", or it is either "right" or "wrong"; I also believe that "the good of the whole" should take precedence over the welfare of any one individual.

____C. I believe that "truth is relative" – what is "true" or "right" depends upon the specific circumstances of the situation at issue; I also believe that generally the welfare of the individual should take precedence over that of the group – i.e., the best solution to a problematical situation is that solution such that "no one individual gets hurt".

____D. I believe in absolute truth – something is either "true" or "untrue", or it is either "right" or "wrong"; I also believe that generally the welfare of the individual should take precedence over that of the group – i.e., the best solution to a problematical situation is that solution such that "no one individual gets hurt".

V. Demographics

Please answer the following questions about yourself as accurately as possible. <u>This information will be held in the strictest of confidence!!!!</u>

1. Sex
    a. Male
    b. Female

2. Major _____ (if you are double-majoring, put them both down)

3. Number of hours completed towards your major - _____

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