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National Culture and Subordinates' Upward Communication of Private Information

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Key Words: National culture; Management controls; Subordinate communication truthfulness

Abstract: *This study investigates the effects of national culture on the truthfulness with which subordinates communicate upwards under alternate pay schemes. U.S. nationals and Chinese nationals in Taiwan were used to represent members of two cultures that significantly diverge on three cultural dimensions postulated to be relevant to this behavior: Confucian dynamism, individualism/collectivism and a correlate of the latter: concern with "face."*

The results of an experiment were consistent with the prediction that in the absence of face-to-face interactions with superiors, Chinese relative to U.S. nationals would make smaller misrepresentations of their private information. Also consistent with prediction based on concern with "face", both national samples had lower levels of misrepresentations when there was face-to-face interaction between superior and subordinate. However, contrary to prediction, U.S. nationals reacted more to such interactions than did their Chinese counterparts. Taken as a whole, these findings support the importance of national culture and attributes of the control setting on subordinates' communication truthfulness. At the same time, they suggest that how these factors affect employee behavior is more complex than hypothesized.

INTRODUCTION

Resource allocations in decentralized firms often rely on information supplied by subordinate managers. If these managers are not properly motivated or controlled, then they may misrepresent their private information to further their self interests at the firm's expense (Dye, 1983; Penno, 1984; Radner, 1986). Analytical research has proposed pay schemes for motivating truthful subordinate reporting, and three experimental accounting studies—Waller and Bishop (1990), Chow et al. (1994a, 1995)—have tested the truth-inducing properties of some of these schemes. In particular, all three studies have compared subor-

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dinates' communication truthfulness under the reportedly common linear profit sharing (LPS) scheme against one (Groves) that has received much attention in the analytical literature (Groves, 1973, 1976; Green and Laffont, 1977; Groves and Loeb, 1979; Jennergren, 1980).[1] All found the Groves scheme to be more effective than the LPS scheme at suppressing subordinates' misrepresentations of private information, though it did not eliminate subordinate misrepresentations.[2]

While these prior studies have advanced understanding of how incentive schemes affect subordinates' communication truthfulness, their findings are limited by the narrow scope of the experiment. In particular, all three studies have focused on the analytical properties of the pay schemes tested, and suppressed personal interactions between superior and subordinate. Yet both the organizational communication and accounting literatures have long identified face-to-face interactions between superiors and subordinates as an important form of management control (Lewis, 1980; Birnberg and Snodgrass, 1988; Merchant, 1989). Thus, in his critique of accounting experimental studies on employment contracts, Waller (1994) stressed the need to go beyond the analytical properties of such contracts to systematically introduce "experimental treatments that represent behavioral as well as economic conditions," because they may reveal "empirical patterns that supplement the insights derivable from analytical methods" (p. 722). Along the same vein, Baker et al. (1988) have suggested that economic models of incentive schemes may need to be enriched by incorporating the insights of psychologists, behaviorists, human resource consultants and personnel executives for compensation practices. The current study is, in part, a response to these calls for change by introducing face-to-face interactions between superiors and subordinates.

A related objective is to explore whether the effects of controls can be generalized across national boundaries. There is accumulating evidence that people from different nations differ in their work-related values and how they react to management practices (Adler, 1996; Birnberg and Snodgrass, 1988; Chow et al., 1996; Hofstede, 1980, 1991; Kreder and Zeller, 1988; Vance et al., 1992; Vertinsky et al., 1990). For example, Chow et al. (1996) have found that relative to their U.S. counterparts facing the same tightness of controls, Japanese profit center managers were less inclined to engage in activities that were dysfunctional to the company (e.g., myopic actions and data manipulations). Cultural differences also have been suggested as potential explanatory factors for many U.S. companies' failed attempts to adopt Japanese management practices (Fucini and Fucini, 1990; Naj, 1993; Young, 1992). Thus, there is reason to expect that both the mix of management problems (e.g., the extent to which subordinates will engage in misrepresentations), and the most effective means of controlling them may differ cross-nationally. In the current study, national culture is hypothesized to affect subordinates' communication truthfulness under alternate performance-based pay schemes, and in the absence as opposed to the presence of face-to-face interactions with superiors. Beyond advancing understanding of the determinants of subordinate misrepresentations, the findings also can help the design of controls to curtail their occurrence in different national settings.

National culture is tested in this study by comparing U.S. nationals and Chinese nationals in Taiwan. The former are broadly representative of the Anglo-American cultural cluster (e.g., Australia, New Zealand, United Kingdom, United States), while the latter are part of the Chinese-based cluster (e.g., Mainland China, Taiwan, Singapore) (Harrison et al., 1994; Hofstede, 1980, 1991; O'Connor, 1995). Aside from being divergent from U.S. cul-

ture—thus enabling a more powerful test of culture's effects—Chinese-based culture is worthy of study because of the emergence of the People's Republic of China and the economic power of the overseas Chinese (Barnathan et al., 1993; Drucker, 1994; Kraar, 1993; Merchant et al., 1995).

The remainder of this paper is organized as follows. The next section provides a review of the literature as the basis for developing two hypotheses. Then the research method and findings are presented. The final section provides a summary and discussion.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

National Culture and Subordinate Behavior

Many alternative ways to operationalize the national culture construct have been proposed (Adler, 1996; Child, 1981; Hofstede, 1980, 1991; Schein, 1985; Schwartz, 1994; Smith et al., 1996; Triandis, 1984). Synthesizing these varied approaches is beyond the scope of this study, and we organize our discussion and analysis around Hofstede's (1980, 1991) taxonomy in part because it is well supported empirically (e.g., Bochner (1994), Chinese Cultural Connection (1987), Hofstede and Bond (1984), Sondergaard (1994)), and in part because it is arguably the most widely cited and applied in management and accounting research (e.g., Chow et al., 1991, 1994b, 1996; Gudykunst and Ting-Toomey, 1988; Harrison, 1992, 1993; Harrison et al., 1994; O'Connor, 1995; Merchant et al., 1995; Soeters and Schreuder, 1988).

Hofstede's (1980, 1991) taxonomy identifies five major components of national culture: individualism/collectivism, Confucian dynamism, masculinity/femininity, power distance, and uncertainty avoidance.[3] Of these, individualism/collectivism, Confucian dynamism, and a correlate of the former—concern for "face"—are especially relevant to the phenomenon of interest in this study.[4]

Individualism/Collectivism

Individualism and its opposite, collectivism, relate to the relative emphasis that individuals place on their self interests as opposed to those of the group (e.g., family, company). Students of culture have often cited this attribute as being a fundamental, or core, value that differs across nations, especially those from the East and West (Triandis, 1989; Lachman et al., 1994). According to Hofstede (1980, p. 166), employees from collectivist cultures tend to have an emotional dependence on, and a perceived moral involvement with, the company, and practices and behaviors are premised on a sense of loyalty and duty binding the individual to the organization. In contrast, members of individualist cultures tend to be emotionally independent from the company, their involvement with the latter tends to be calculative, and work-related practices and behaviors tend to allow for individual initiative and expression.

In the case of U.S. nationals and Chinese nationals in Taiwan, Hofstede (1991, p. 53) has reported individualism scores of 91 and 17, respectively. Consistent with Hofstede's numerical findings, students of Chinese-based culture have often cited collectivism as one of its main characteristics, noting especially its emphasis on subjugating one's own inter-

ests to those of the collective (Bond et al., 1982; Bond and Hwang, 1986; Leung and Bond, 1984; Redding, 1980). In contrast, the self-interest motive is often identified as the cornerstone of Anglo-American management theories and practices (Bellah et al., 1987; Earley, 1993; Harris and Moran, 1987; Triandis et al., 1988). To the extent that Chinese nationals emphasize collective interests more so than U.S. nationals, they are less likely to seek personal gain (such as through misrepresenting their private information) at the expense of the firm when facing the same pay scheme as the latter.

Concern with "Face"

A correlate of individualism/collectivism is concern with "face." "Face" represents the positive social value that a person claims for him/herself by the line that others assume he/she has taken during a particular contact (Goffman, 1955), and would be lost if he/she fails to meet essential requirements placed upon him/her by virtue of the social position that he/she occupies. In the case of subordinates reporting their private information to superiors, misrepresentations of such information would tend to reduce the effectiveness of resource allocations. Since such dysfunctional acts may be detected (e.g., when outcomes are compared to submitted projections), subordinates' concern for face in the social setting of an employment relationship can be expected to reduce their misrepresentation tendencies. Consistent with the view that interpersonal interactions can affect behavior, Young (1985), Young and Lewis (1995) and Waller (1994) have suggested that social pressure to refrain from opportunistic behavior can significantly affect managerial actions. However, accounting studies to date on subordinates' communication of private information have not directly examined this determinant of behavior.[5]

Redding and Wong (1986, p. 286) note that while concern with face is a human universal, for the Chinese the degree of concern is particularly high. The reason for this, as explained by Ho (1976, p. 871), is that in the context of Chinese-based culture, "face is always attached to status...At stake is nothing less than the effective maintenance of one's standing in society." In contrast, Hofstede (1980) and Triandis (1989) observe that since members of an individualist culture are supposed to look after themselves, an individual's self respect can be preserved regardless of what other people think about him/her. Thus, while maintaining the respect of peers still is important in an individualist culture, it is less so than obtaining "inner-directed" satisfaction (Harrison, 1993).

Confucian Dynamism

According to Hofstede and Bond (1988), Chinese Cultural Connection (1987) and Hofstede (1991), this cultural dimension relates to the extent to which people emphasize long-term over short-term goals and concerns. In the case of subordinates misrepresenting their private information to superiors for short-term gain, detection of such misrepresentations can damage their long-run standing and prospects. To the extent that member of a high Confucian dynamism culture are more concerned with their actions' long term consequences, they are more likely to refrain from such behavior.

Hofstede (1991, p. 166) reports that the Confucian dynamism scores of U.S. nationals and Chinese nationals in Taiwan are 29 and 87, respectively. This directional difference

suggests that relative to their U.S. counterparts, Chinese nationals would be more concerned with long-term than short-term gains.

HYPOTHESES

Based on the directional differences between Chinese and U.S. nationals on individualism/collectivism, concern for "face," and Confucian dynamism, we predict that they would react differently to the same pay scheme both in the presence and absence of face-to-face interactions with superiors. In the case of face-to-face interactions being absent, we expect misrepresentations of private information to be lower for Chinese relative to U.S. subordinates. First, the Chinese nationals' higher collectivism should make them more reluctant to seek private gain (via misrepresentations) at the expense of the organization. Second, since misrepresentations may be detected with the passage of time, Chinese nationals' greater concern for long-run consequences (via their higher Confucian dynamism) should further dampen their misrepresentation tendency. Hence:

H1: In the absence of face-to-face interactions with superiors, Chinese nationals would misrepresent their private information to a more limited extent than would U.S. nationals working under the same pay schemes.

When face-to-face interactions with superiors are present, issues of "face" become more salient. Since concern with "face" is universal, both Chinese and U.S. nationals are expected to have lower misrepresentations in the presence of such interactions. However, since Chinese relative to U.S. nationals have a greater concern for "face," the deterrent effect on them should be stronger. Thus:

H2: Controlling for the type of pay scheme, face-to-face interactions with superiors reduce misrepresentations by Chinese nationals more than they do for U.S. nationals.

METHOD

Design

The experiment had six cells derived from three between-subjects factors. Each factor had two levels. The first factor was national origin (U.S., Chinese). The second was pay scheme. The LPS and Groves schemes were selected because both have been included in all three related prior studies, such that their findings can potentially be related to the current study for additional insights. Because of resource considerations, the third between-subjects factor—presence vs. absence of face-to-face interactions between superior and subordinate—was crossed with only the LPS scheme. This choice was based on prior research having found the LPS scheme to induce high levels of subordinate misrepresentations. If the presence vs. absence of face-to-face interactions does affect subordinate misrepresentations, then this effect is more likely to be manifest under the LPS scheme.

Subjects

The sample consisted of 144 volunteer subjects, half each from Taiwan and the U.S.. All were full time upper-division undergraduate business students at a major university in their respective countries. During recruitment, subjects were told that they would earn cash based on their performance in a management simulation, but neither the nature nor the objective of the experiment was revealed to them. To increase homogeneity of cultural values within each national sample, all U.S. subjects were non-oriental while all Taiwanese subjects were of Chinese ethnicity and spoke Chinese as their first language.

Task

Consistent with the focus on allocating limited resources among alternate uses, the task involved pairs of division managers submitting competing project proposals to a central manager. In both national settings, each treatment was randomly assigned 24 subjects, who formed 12 pairs of division managers. The role of central manager for each pair was assumed by a research assistant to maintain consistency across pairs and treatments.[6,7]

In each of 20 experimental periods, each division manager first privately observed the expected ratio of output to input (the "p" ratio) for each of three projects. Then he/she submitted (either truthfully or otherwise) to the central manager a p-ratio for each project. Each project required 100 units of resource and the central manager only had 300 units available. Hence, only half (three out of six) of each period's proposed projects could be selected. Similar to Waller and Bishop (1990) and Chow et al. (1994a, 1995), the central manager allocated the firm's limited resources to maximize the total expected output, and had to do so strictly based on the division managers' communicated p-ratios for the period. This approach was known to all participants. They also knew that the central manager had no access to the true p-ratios before making the project funding decision, and that only the funded projects' true p-ratios would become known at the end of the period.

The use of 20 periods was aimed at overcoming the prior studies' potential lack of sufficient trials for subjects to understand the experimental setting and to develop their communication strategies.[8] The first 15 periods were designed for learning, and had their self-contained set of p-ratios. Periods 16-19 had their own set of p-ratios for hypothesis testing. Period 20 was dropped to control for end-period effects (e.g., a manager changing his/her communication strategy in the last period to take advantage of his/her paired manager's stable strategy).[9]

The subjects were paid cash based on their performance as computed under their assigned pay schemes. The translation rates between measured performance and cash were preset and known to each subject. These rates differed between the U.S. and Taiwanese subjects to allow for differences in local pay scales. For the U.S., the expected cash pay was $.75 per experimental period under truthful communications.[10]

Procedure

Since running the experiment was highly labor intensive, only 4 or 6 subjects were scheduled for each time slot. In both countries, all subjects randomly scheduled for a given

time slot were assigned to the same treatment. The experiment took about three hours and contained the following three steps:

Step One

When the subjects arrived, they were randomly assigned to a division manager position and directed to a room dedicated to that position. To limit the potential for tacit collusion (e.g., subjects coordinating their communications to yield the highest combined pay for each period, and splitting the total pay later), no subject was allowed to know who he/she was paired with in the experiment.

Upon arrival at the assigned room, each subject was given a packet containing the task instructions, a form that he/she could use to keep track of decisions and outcomes, and 20 sealed envelopes, one for each experimental period. Each envelope contained a communication form and the actual p-ratios for that period's three projects. The subjects were told not to open any of the materials until instructed to do so.

Step Two

The subjects read through the experimental instructions. These provided detailed explanations of the experimental task, the assigned pay scheme, and the order of events in each period. Then the subjects completed a set of numerical exercises to test their understanding of how alternate communication strategies may feed into the central manager's project selection decisions, and in turn how such decisions would affect their measured performance. Correct answers were provided at the end of each exercise.

Step Three

The subjects completed 20 experimental periods. Below, the procedure for the subjects assigned to the LPS scheme without face-to-face interactions (LPS) will first be explained. Then deviations for the subjects assigned to the Groves scheme and LPS with face-to-face interactions (LPS-FF) will be noted.

1. After privately observing his/her three actual p-ratios, each division manager wrote on his/her communication form for that period a p-ratio for each project to be reported to the central manager.
2. The central manager collected both division managers' communication forms and mechanistically selected the three projects (out of the combined six from both division managers) with the highest communicated p-ratios. (The subjects were aware that ties would be broken by flipping a coin.) Then he/she marked on each division manager's communication form the latter's project(s) selected for funding, and returned each form to the appropriate division manager.

Subjects assigned to the Groves scheme also received, at the end of each period, the communicated net output of their paired managers' funded project(s) for the period. This information was needed by each manager under the Groves scheme to compute his/her performance measure for the period.

For subjects assigned to LPS-FF, an additional event occurred at the beginning of each period, starting with period 2. Prior to communicating that period's *p*-ratios to the central manager, each division manager was separately visited by the latter. At this meeting, the division manager had to reveal to the central manager the true *p*-ratios for those of his/her projects that had been funded in the prior period (much like a comparison of actual vs. budgeted performance). Then the central manager made the following verbal statement. (The phrase in parentheses was included only if there was a deviation between a subject's actual and communicated *p*-ratios.)

> Last period, you had proposed three projects for funding from the company's limited pool of funds. (Now, it appears that you had mis-communicated the *p*-ratio(s) for the following funded project(s)....) It is important to note that I had relied on your projections to select the projects for funding allocations so as to maximize the profit for the company. It is your responsibility as well as mine to make sure that we achieve the company's financial goal. Now we are about to start the funding decisions for the next period. Please prepare your funding proposals so I can again allocate the company's limited funds between you and the other manager.

Then the central manager left each division manager to fill in his/her communication form in private, and returned to collect it later.[11]

At the end of the 20th period, the subjects completed a post-experiment questionnaire which contained several manipulation check questions. They were paid later, after their earnings had been verified.

RESULTS

Manipulation Checks

Responses to the exit questionnaire indicated that the subjects from both nations had high levels of task involvement and had correctly understood the information asymmetry between them and the central manager.[12] To gain some assurance that the two national samples did differ on individualism/collectivism and Confucian dynamism as assumed, an additional questionnaire was administered to the LPS-FF subjects on these cultural dimensions. Based on Hofstede's Scoring Guide (1982), the Chinese subjects' individualism index was -7.25 vs. 46.42 for the U.S. subjects. This directional difference is consistent with assumption. For Confucian dynamism, we selected six items from the Chinese Cultural Connection (1987) instrument which related to this cultural dimension: harmony with others, non-competitiveness, close friendships, solidarity with others, trustworthiness, and having a sense of shame (face saving). The 10-point response scale was anchored by 1 = "of no importance" and 10 = "of supreme importance." The mean Chinese responses were higher for all six items, with four of these differences being significant at $p = .05$. Specifically related to concern with face saving, the mean U.S. response of 6.17 was statistically significantly lower than the Chinese mean of 7.17.

Table 1. Number of Manager Pairs Reaching Steady State Communication Strategy by Period

Period	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
U.S. Sample																			
LPS	0	0	2	1	1	2	2	0	1	0	0	0	0	0	0	3	0	0	0
Groves	0	1	0	2	3	2	1	1	0	0	0	0	0	0	0	2	0	0	0
LPS-FF	0	1	0	3	1	0	1	1	0	0	1	0	0	1	0	3	0	0	0
Chinese Sample																			
LPS	1	2	1	1	1	0	0	0	2	0	0	0	0	0	0	4	0	0	0
Groves	1	1	3	1	1	0	1	1	0	0	0	0	0	1	0	2	0	0	0
LPS-FF	0	0	6	1	1	0	1	0	1	0	0	0	1	0	0	1	0	0	0

DESCRIPTIVE STATISTICS

The means (standard deviations) of the division managers' cash earnings were as follows for the U.S. subjects: LPS: $13.20 ($4.22), LPS-FF: $13.84 ($1.96), and Groves: $14.39 ($1.75). After adjusting for local pay scale differences, the corresponding numbers for the Chinese subjects were: LPS: $14.11 ($2.57), LPS-FF: $14.50 ($2.25), and Groves: $14.55 ($0.44). The mean pay for each treatment did not differ significantly between the two national groups, and also appeared to be adequate (though not generous) for the length of the experimental session.

To assess whether 15 periods was sufficient for subject learning, each subject was asked to identify the period by which he/she had developed a consistent communication strategy. These self-reported data (Table 1) show that all manager pairs had developed a communication strategy by period 16—the start of our test periods. Table 1 also shows that while quite a few subject pairs reported having developed a stable communication strategy early in the experiment, 19 pairs did not attain this state until after period 10. While self-reported data like these admittedly are subject to error, they still provide some assurance that enough periods had been provided for subject learning.[13] And although it was feasible to use data from each pair's steady state periods for hypothesis testing (e.g., the data for periods 12-19 for a pair that had reached steady state in period 12), we elected to focus on periods 16-19 for two main reasons. One was that this conservative approach provides some protection against subject error in judging when they had developed a consistent reporting strategy. More important, since all subject pairs had faced, by design, the same four sets of p-ratio triads in periods 16-19 (cf fn. 9), their misrepresentations in these periods could be directly compared. Below, all of the statistics and test results are based on periods 16-19.

Following the approach of Waller and Bishop (1990), we constructed two misrepresentation measures for each communicated p-ratio. Absolute misrepresentation (AM) was the absolute value of the difference between the actual and communicated p-ratios. Relative misrepresentation (RM) measured the extent of misrepresentation out of the total amount possible. For no misrepresentation, RM = 0; for an overstatement, RM = AM/(2.0 - actual p-ratio); and for an understatement, RM = AM/(actual p-ratio - 1.0).

Table 2 presents selected distributional statistics for RM (Panel A) and AM (Panel B). Two patterns can be noted. First, for both national samples, the mean values of both AM

Table 2. Distributional Statistics for P-Ratio Misrepresentations

	U.S. Sample			*Chinese Sample*		
	LPS	*Groves*	*LPS-FF*	*LPS*	*Groves*	*LPS-FF*
Panel A: Relative Misrepresentations (RM) for Periods 16-19						
Mean	.636	.226	.309	.487	.162	.270
Std. dev.	.358	.275	.379	.391	.267	.320
Minimum	0	0	0	0	0	0
Maximum	1	1	1	1	1	1
Panel B: Absolute Misrepresentations (AM) for Periods 16-19						
Mean	.272	.075	.120	.169	.052	.086
Std. dev.	.224	.121	.184	.200	.082	.123
Minimum	0	0	0	0	0	0
Maximum	.89	.89	1	.92	.81	.74

and RM are higher under LPS than LPS-FF, with those under Groves being lowest. Second, both mean RM and AM are lower for the Chinese sample than its U.S. counterpart under each pay scheme. And as might be expected based on these patterns, RM and AM are highly and positively correlated (Pearson $r = .638$, $p<.000$). Since the results were qualitatively identical between RM and AM, only those based on RM are reported below.

HYPOTHESES TESTS

Test of H1

H1 stated the expectation that in the absence of face-to-face interactions with superiors, subordinate misrepresentations would be smaller for Chinese relative to U.S. nationals. This hypothesis was tested with an analysis of variance (ANOVA) using each national sample's data for the LPS and Groves cells. The dependent variable was RM, averaged over the three projects per period to yield four observations per manager.[14] The independent variables were national origin (Chinese, U.S.), pay scheme (LPS, Groves) and their interaction. The overall model was highly significant ($F = 53.14$, $p = .000$), as were the main effects due to nation and pay scheme (respectively, $F = 12.53, 143.79$; $p = .000, .000$). The interaction between nation and pay scheme was only marginally significant ($F = 3.10$, $p = .079$).

To further elucidate the nation main effect, t-tests for equality in means were conducted between nations for the same pay scheme. Consistent with H1, under both LPS and Groves, mean RM was significantly lower for the Chinese than for the U.S. sample (respectively, $t = 23.40, 10.41$; $p = .000, .000$).[15] Thus, H1 was supported.

Test of H2

H2 stated the expectation that Chinese subordinates would respond more than their U.S. counterparts to the presence of face-to-face interactions with superiors. The ANOVA to test this hypothesis used each national sample's data for the LPS and LPS-FF cells. RM was the dependent variable. The independent variables were national origin (Chinese, U.S.), face-to-face interaction (present, absent) and their interaction term.[16]

The overall model was highly significant ($F = 29.30$, $p = .000$). The main effects due to nation and face-to-face interaction were both highly significant (respectively, $F = 9.53, 74.54$; $p = .000, .000$). And in apparent conformity to expectation, the interaction term between nation and face-to-face interaction also was statistically significant ($F = 3.83$, $p = .05$).

Since H2 was predicated on concern with "face" having an impact on behavior, further analysis of this effect was conducted using the Chinese and U.S. subjects in the LPS-FF treatment. An ANOVA was performed using these subjects' RM as the dependent variable. The independent variables were national origin (Chinese, U.S.), these subjects' responses to the Chinese Cultural Connection (1987) item "having a sense of shame (face saving)," and their interaction. The model as a whole was significant ($F = 2.75$, $p = .044$). Neither the nation main effect nor its interaction with "face saving" was significant (respectively,

$F = .008, .385$; $p = .93, .54$), but the main effect due to "face saving" was significant ($F = 7.29$, $p = .008$). Furthermore, the pattern of mean RMs was consistent with the hypothesized effect of concern with face. Using the median observed value (6.0) to dichotomize each national sample into high vs. low concern for face, mean RM for the high-concern U.S. subjects was 0.21 vs. 0.36 for those with low concern. For the Chinese sample, mean RM for high-concern subjects was likewise lower than that for the low-concern subjects (0.23 vs. 0.33).

The pattern of cell means for the interaction between nation and presence/absence of face-to-face interaction was, however, opposite to that predicted. Whereas mean RM under LPS (i.e., the absence of face-to-face interactions) was significantly higher for the U.S. than for the Chinese sample (from H1: $t = 23.40$, $p = .000$), the two national samples' mean RMs were not significantly different under LPS-FF, when such interactions were present ($t = 1.33$, $p<.185$). In other words, rather than diverging further in the presence of face-to-face interactions, the two national samples' misrepresentations became more equal. This outcome was due to the U.S. subjects having a bigger reduction in mean RM between LPS and LPS-FF (.636 vs. .309; $t = 10.36$, $p<.001$) as compared to their Chinese counterparts (.487 vs. .270, $t = 7.28$, $p<.001$).

A possible explanation for the Chinese sample's smaller RM reduction is that it had a lower starting point (when face-to-face interactions were absent), such that it did not have as much misrepresentation to forego as its U.S. counterpart. To explore this possibility with the available (between-subjects) data, we deleted all foursomes of manager pairs (one pair from each of the four cells from crossing nation with LPS vs. LPS-FF) that had either zero, or the same low mean RM. Then we reran the tests for H2 using this truncated sample, and obtained qualitatively equivalent results. As with the full sample, under LPS and the absence of face-to-face interactions, mean RM was significantly higher for the U.S. than for the Chinese nationals (.77 vs. .58; $t = 4.33$, $p = .000$). And under LPS-FF, mean RM remained statistically insignificantly different between them (.40 vs. .34; $t = 1.26$, $p = .21$). This similarity of results between the full and truncated samples fails to provide support for the "floor effect" explanation.

SUMMARY AND DISCUSSION

Consistent with predictions based on individualism/collectivism and Confucian dynamism, when face-to-face interactions with superiors were absent, Chinese subjects misrepresented their private information to a smaller extent than U.S. subjects under the same pay scheme. Also consistent with concern for "face" affecting subordinate behavior, both U.S. and Chinese nationals had significantly lower levels of misrepresentations when such interactions were present. Within both national samples, the level of misrepresentation was negatively related to the degree of concern for face.

The findings, however, were contrary to the expectation that Chinese nationals would respond more to the presence of face-to-face interactions. The decrease in mean misrepresentations between the absence vs. presence of face-to-face interactions was greater, rather than smaller, for U.S. than for Chinese nationals, with the mean misrepresentation levels being not significantly different between the two national samples when face-to-face interactions were present. An exploratory test did not indicate that this result was due to the Chi-

nese nationals having started from a lower level of misrepresentations when face-to-face interactions were absent.

Overall, these experimental findings are consistent with national culture having an important effect on subordinates' communication truthfulness to superiors. They also reveal that the way effects arise is more complex than had been assumed. Specifically, the unexpected greater effect of face-to-face interactions on U.S. vs. Chinese nationals suggests the need to further understand the nature of concern for "face", as well as how "face"-related considerations arise in different national settings. More important, while this study has extended experimental research to a richer environment by incorporating interpersonal interactions and cross-cultural considerations, it still falls far short of capturing the complex setting in which superiors and subordinates interact. Given the importance of information sharing within organizations and the increasing globalization of economic activities, further work to validate and extend this study is highly desirable. In particular, this study has examined only two pay schemes and national cultures. And within each culture, the subjects had come from only one institution. Expanding each of these dimensions can shed light on the findings' robustness, as well as illuminate how components of each dimension independently and interactively affect subordinate communication behavior. For example, including students from other universities can help to assess whether the findings are institution-specific, while engaging managers from real world organizations can shed light on the findings' generalizability to practice. Relating to individualism/collectivism and Confucian dynamism, since they were hypothesized to affect behavior in the same direction, it was not possible to differentiate between them or to assess the relative sizes of their impacts. By designing settings that implicate these (and other) cultural dimensions in different directions, more insight can be obtained into how national culture affects people's behavior in employment settings.

Beyond studying upward communications by subordinates, it is desirable to explore the determinants and effects of horizontal and downward communications within organizations. Furthermore, organizations' concerns probably extend beyond communication truthfulness to include such factors as employee work effort, learning and improvement, teamwork, risk taking, short vs. long term tradeoffs, satisfaction, and job stress. Thus, concurrent with enriching the context being studied, there is room for considering a fuller set of factors in the objective function.

Finally, this study has used a laboratory experiment. While this approach has areas of strength (e.g., control, internal validity, replicability), it also has weaknesses (e.g., potential lack of external validity) (Birnberg et al., 1990). Given the importance of the issues being considered here, expanding the scope of investigation to include multiple methods (e.g., surveys, field studies, archival analysis) would be very desirable.

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NOTES

1. Analytical research has suggested many truth-inducing pay schemes beyond that of Groves (e.g., Banker & Datar, 1992; Kanodia, 1993; Osband & Reichelstein, 1985). However, none of these schemes has received nearly as much attention and empirical testing as the Groves

scheme. We limit our discussion to the latter because it has been tested by all three related prior studies.

Under the Groves scheme, a manager's performance measure is a function of his/her actual output and other managers' projected output for the levels of resources provided to them. Groves and Loeb (1979) have analytically demonstrated that, in a one-period setting and without collusion among risk-neutral subordinates, the dominant strategy for each subordinate under the Groves scheme is to truthfully communicate his/her private information. In contrast, Waller and Bishop (1990) and Chow et al. (1994a) have shown that the LPS scheme motivates managers to overstate their projects' expected profitability.

2. In addition, Waller and Bishop (1990) found that an extreme form of "unit-profit-plus-penalty" scheme—under which pay was reduced to zero for any deviation between actual performance and budget—also reduced subordinate misrepresentations. Chow et al. (1995) found that combining the LPS scheme with probabilistic audits was as effective as the Groves scheme at deterring subordinate misrepresentations.
3. Since Hofstede's taxonomy has been so often used in accounting research, a detailed description of the five cultural dimensions is omitted. Interested readers can obtain such descriptions from, for example, Harrison et al. (1994) and Merchant et al. (1995).
4. To the extent that our study focuses on superior-subordinate relationships, a case can be made that the power distance cultural dimension also may be relevant. In an employment setting, this cultural dimension relates to the degree to which subordinates are willing to accept an inequality of power between them and their superiors and to follow directives given to them by the latter, including truthful reporting of their private information (Merchant et al., 1995). According to Hofstede (1980, 1991), Chinese nationals in Taiwan are higher in power distance than U.S. nationals (58 vs. 40). This relative placement of the two cultures is consistent with other studies of Chinese-based vs. Western cultures (e.g., Harrison, 1992, 1993; Harrison et al., 1994; O'Connor, 1995). However, Hofstede (1980) also has cautioned that based on the observed distribution of the cultural dimensions across countries in his sample, only cross-national differences of 20 points or more should be considered significant. Based on his admonition, and the fact that the superiors in our experiment had no direct authority over the subordinates beyond selecting projects for funding, we consider the role of power distance to be minimal in our study. We also omitted uncertainty avoidance and masculinity because our experimental task and design did not include manipulations (e.g., the extensiveness of standardized operating procedures and the degree of challenge in the performance standard) which implicated these cultural dimensions.
5. The findings of Young's (1985) study did suggest that the subjects' misrepresentation behavior (creation of budgetary slack) was affected by social concerns. However, it did not directly test this effect as the nature of the superior-subordinate relationship was not varied across treatments.
6. Both the experimental materials and the conduct of the experiment in Taiwan were in Chinese. The English materials were first translated into Chinese by one of the bilingual members of the research team. Then it was independently evaluated by another bilingual team member for adherence to the original. Only minor deviations had to be resolved through discussion.
7. Two research assistants were used in each national setting. All were male graduate students. Each assistant was trained for up to two hours before assuming his role in the experiment.
8. Waller and Bishop (1990) used a total of 10 experimental periods, while Chow et al. (1994a, 1995) used nine periods. We used double the number of periods of Waller and Bishop because of their observation that the number of periods in their experiment may have been insufficient for subjects to fully understand the properties of their pay schemes for developing their communication strategies, especially under the Groves scheme.
9. Separate sets of p-ratio triads were developed for periods 1–15 vs. 16–19 as follows. First, 60 p-ratios were randomly generated using a uniform distribution with a range of 1.0 to 2.0. Incre-

ments of .01 were used. These p-ratios were randomly grouped into 20 sets of three. Then, a duplicate set of these 20 triads was created and randomly matched to the original set to yield 20 pairs of p-ratio triads. These 20 pairs were divided into three subsets with 15, four, and one member(s), respectively. The subset of 15 pairs was used in periods 1–15 in 12 random orders, one per manager pair. (Each manager got one of the two p-ratio triads in each set.) The subset of four p-ratio triads was used in periods 16–19, and the final subset was used in period 20.

10. Under the LPS and LPS-FF treatments, the translation rate for the U.S. subjects was $1 in cash for each 144 units of performance measure. The cash pay to the Chinese subjects was at 60 percent of this level to adjust for differences between accounting graduates' beginning salaries in the U.S. and Taiwan. Because of the way the performance measure is calculated under the Groves scheme (see Waller & Bishop, 1990; Chow et al., 1994a), its scale was double that of the LPS scheme given the parameter values in our experiment. To preserve parity in expected cash pay across treatments, the translation rate between performance units and cash for the Groves subjects was 288 to $1. We acknowledge that these different translation rates may bias the results (against the Groves scheme in our case). However, the alternative of using the same translation rate would create an opposite bias by making the cash gain per unit of misrepresentation higher under Groves than the LPS scheme. While the preceding caveat has to be borne in mind, note that despite the potential bias against the Groves scheme, misrepresentations still were lower under it than under LPS.
11. This added verbal exchange did not alter the arrangement that the central manager made each period's project selections strictly based on the two division managers' communicated p-ratios for the period.
12. The question on task involvement was "To what extent did you make your decisions as if you were actually involved in a real business situation?" The information asymmetry question was "How much did the central manager know about your actual p-ratios right after sending your messages in each round?" The 10-point response scale for each question was anchored with 1 = "not at all" and 10 = "totally." The mean responses from both national samples were substantially above and below the midpoint, respectively, for the two questions.
13. The data in Table 1 suggest that if we had followed the approach of Waller and Bishop (1990) (which used all 10 periods' data) or Chow et al. (1994a, 1995) (which alternately allowed 3 or 5 learning periods), then over half of the communicated p-ratios used in the statistical analyses would not have reflected a steady state communication strategy.
14. We did not treat each reported p-ratio as an independent observation because the managers' decisions regarding their numerical values are likely to be correlated. For example, if one project has a very high true p-ratio, a manager probably would not overstate a less profitable project's p-ratio to the extent of causing it to be funded over the former. We also performed the same set of analyses by aggregating each manager's relative misrepresentations over all four test periods to yield one observation per manager. The results were not qualitatively different.
15. For all reported t-test results, the results of non-parametric Mann Whitney U-tests were qualitatively identical.
16. Note that our test focused on the levels of misrepresentations under LPS and LPS-FF, rather than the difference between them. This is because the face-to-face interaction treatment was between, not within, subjects.

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