

**Management accountants' engagement in the
creation of budget slack: experimental evidence of
the interactive effect of function design, social
pressure and Machiavellianism**

PRELIMINARY DRAFT
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Abstract

It is the professional responsibility of management accountants to prevent managers from building slack in their units' budgets. It has been suggested that management accountants who are actively involved in managerial decision-making processes will take this responsibility less seriously and are more likely to collide with managers in the creation of budgetary slack. Research also suggests that the extent to which management accountants behave unethically and create slack is a function of the pressure exerted on them by unit managers and personality characteristics such as Machiavellianism. This study builds on insights from the accounting and business ethics literatures and hypothesizes that involvement in management, management pressure and Machiavellianism affect management accountants' engagement in the creation of budget slack interactively. More specifically, it is proposed that only relatively Machiavellian accountants become more susceptible to pressure when they have been involved in management. For less Machiavellian accountants involvement in management is expected to decrease the effectiveness of pressure. An experiment with 70 postgraduate management accounting students as participants finds support for this reasoning.

1. Introduction

Over the past decades, management accountants have got more involved in operational and strategic decision-making (Siegel & Sorensen, 1999; Garg *et al.*, 2003). Technological developments have led to innovations such as ERP systems which have substantially reduced the time that management accountants need to spend on their more traditional tasks such as collecting and reporting performance data. Spurred by the professional literature (e.g. Blazek, 1994; Matthews, 1998; Regel, 2003) accountants have used this extra time to get more involved in activities that were traditionally reserved for general management and functional areas such as information system development and marketing. Yet, although their more traditional tasks now require less time, the basic responsibility associated with these tasks has not changed. Management accountants are still responsible for ensuring that objective and unbiased financial data is sent up the organizational hierarchy. For example, the Statement of Ethical Professional Practice of the Institute of Management Accountants (IMA, 2005) posits that each member has a responsibility to “Communicate information fairly and objectively” (Standard IV-1) and to “Disclose all relevant information that could reasonably be expected to influence an intended user’s understanding of the reports, analyses, or recommendations” (Standard IV-2). In addition, each IMA member has a responsibility to: “Refrain from engaging in any conduct that would prejudice carrying out duties ethically” (Standard III-2) and to “Abstain from engaging in or supporting any activity that might discredit the profession” (Standard III-3).

It has often been argued that there is a conflict between the different tasks associated with the management accounting function (Hopper, 1980; Siegel, 2000). More specifically: there is a widespread belief that controller involvement in management can be harmful to organizations because involved controllers are less likely to adhere to standards of professional ethics and are more likely to help managers game performance measurement systems (Sathe, 1982; San Miguel & Govindarajan, 1984; Anthony & Govindarajan, 1998). Recent studies have found evidence that management accountants indeed can be persuaded to build slack in business units’ budgets (Davis, *et al.*, 2006; Indjejikian & Matejka, 2006). However, as yet, there is no evidence that the extent to

which management accountants are involved in managerial decision-making affects their willingness to engage in the creation of slack.

This paper presents the results of an experiment that examined the effects of accountants' involvement in management on the creation of slack. It shows that involvement in management changes the way in which management accountants react to managers' obedience pressure (c.f. Davis, *et al.*, 2006) and furthermore that this reaction is different for more and less Machiavellian individuals (c.f. Reiss & Mitra, 1998; Winter, *et al.*, 2004). The main conclusion is that involvement in management only makes relatively Machiavellian management accountants more susceptible to managers' pressure. Involved management accountants scoring low on Machiavellianism on the contrary, react to higher levels of pressure by falling back on their professional role and become more reluctant to engage in the creation of slack.

The insights of the study are relevant for both research in the fields of business ethics and accounting and for business practice. The next section develops the research hypotheses. Section 3 discusses the experiment that was used to test these hypotheses. A group of 70 part time students from a postgraduate management accounting program at a university in the Netherlands participated in this experiment. The results of the study are presented in section 4 and discussed in the concluding section 5.

2. Hypotheses development

It is well known that unit managers try to build slack in their units' budgets, while corporate managers prefer budgets to be tight to ensure the efficient use of resources (e.g. Douglas & Wier, 2000; Fisher, *et al.*, 2000). Business unit management accountants collect, organize and report the data that is used in budget negotiations. This task requires substantial professional judgment, for example in deciding about the size of provisions and reserves and choosing assumptions and depreciation methods. Management accountants can use this inherent discretion to try to represent the economic reality of the business unit "fairly and objectively" (c.f. IMA, 2005) but can also bias their judgments to help the business unit achieve its goals at a cost to the firm as whole.

Business unit managers will often put their management accountants under pressure to engage in the creation of budget slack (Davis, *et al.*, 2006). Social influence pressure to act in ways that are questionable with respect to professional guidelines can have two different effects (c.f. DeZoort & Lord, 1997; Brehm, *et al.*, 2001). On the one hand, research in auditing and business ethics shows that client and supervisor pressure make it more likely that auditors engage in unethical or unprofessional activities. The reason is that individuals fear the negative consequences of appearing deviant in a group of peers or of acting against the interests of someone who is in an authority position (Brehm, *et al.*, 2001; Lord & DeZoort, 2001). This effect can be called the conformance effect.

On the other hand, social pressure to engage in questionable behavior might actually signal that the individual's engagement in this behavior is not taken for granted and that the behavior in question is really unethical or unprofessional. Higher levels of pressure in that case will not necessarily lead to engagement in the creation of slack. Instead, pressure could even lower slack acceptance because it makes the possible negative consequences of slack creation and the conflict between slack creation and professional objectivity more salient (Van de Vliert, 1981; Grover, 1993; Shafer, 2002). I refer to this effect as the warning signal effect of management pressure.

I expect involvement in management to interact with managers' social pressure in determining the likeliness of accountants' engagement in the creation of slack. First, involvement might strengthen the conformance effect because it changes the way in which management accountants interpret managers' pressure. The literature on escalating commitment (e.g. Tan & Yates, 2002) suggests that because an involved accountant takes part in deciding about the courses of action of the business unit, he will feel a stronger commitment to these courses of action and will be unable to judge their success objectively. On the contrary, he will be more inclined to interpret information cues about decision outcomes in a self-serving manner (Caldwell & O'Reilly, 1982). Moreover, social identity theory suggests that individuals who are part of a group are generally unable to form an objective opinion about matters that concern this group's interests. Involvement in management implies day-to-day interaction with business unit managers and employees and will therefore make business unit membership a more salient aspect of management accountants' self-image (Tajfel, 1969; Tyler & Blader, 2003). For an

involved controller, management pressure thus comes from an in-group as opposed to an out-group person, and the requested behavior will therefore seem more fair and acceptable (Diekmann, *et al.*, 1997; Hertel, *et al.*, 2002).

Together, these findings suggest involvement in management can strengthen the conformance effect of management pressure by making the creation of slack to benefit the business unit seem more acceptable. Yet, involvement in management might also strengthen the warning effect, in the sense that management accountants perceive a situation that combines pressure and involvement as an ultimate test of their backbone and professional objectivity (c.f. Sathe, 1982). Accepting questionable ways of reporting or dubious assumptions underlying budget proposals might be easier for an accountant that operates at arms length of business unit management than for a management accountant who has participated in the unit's operational and strategic decision-making, because the involved accountant is very much aware of the appearance of a conflict of interests and feels more personal responsibility with regards to the reporting choices that she makes (c.f. Davis, *et al.*, 2006). The salience of this conflict and the stronger sense of personal responsibility could make the accountant more reluctant to engage in the creation of slack. In line with this reasoning, studies have shown that professionals that are faced with organizational pressure to act in ways that conflict with professional guidelines, sometimes resolve this conflict by falling back on their professional role (Tuma & Grimes, 1981; Van de Vliert, 1981).

It is proposed here that the extent to which involvement in management strengthens the conformance and warning effects of management pressure is dependent upon the personality, in particular the Machiavellianism, of the management accountant. Individuals scoring high on Machiavellianism ("High Machs") find it easier to separate themselves from moral precepts than "Low Machs" (Mudrack, 1993; Jones & Kavanagh, 1996). This is not to say however that High Machs always behave less ethical or less cooperative than Low Machs (Cristie & Geis, 1970; Wilson, *et al.*, 1996). In stead, they are more calculative and opportunistic and rely less on moral principles in deciding about their actions. Faced with ethical or social dilemmas, High Machs thus decide about their actions by weighting their personal costs and benefits while Low Machs refer to professional and moral values for guidance (Schepers, 2003). Accordingly, I expect

involvement in management to primarily strengthen the conformance effect of pressure for High Mach accountants and to primarily strengthen the warning effect of pressure for Low Mach accountants.

Because of their opportunistic and calculative nature, High Mach accountants will be easier to persuade to act in ways that might be considered unprofessional or unethical, but only if the benefits of acting in such a manner are clear (c.f. Cristie & Geis, 1970). Without apparent benefits, the High Mach accountant will take no risks. For involved High Machs, pressure will make the benefits of slack creation more salient (the conformance effect) so that they are more likely to outweigh the costs. Involved High Machs will thus be more likely to engage in the creation of slack if they are pressured to do so. For uninvolved High Mach accountants the benefits of slack creation will be much less salient and pressure to engage in its creation will be much less effective. In fact, because of the warning effect, uninvolved High Mach accountants might even make more conservative reporting choices if they feel they are pressured to engage in the creation of slack.

Low Mach individuals are less calculative and primarily try to refrain from dubious behavior in those instances where it would really be considered unacceptable by professional and moral standards (Mudrack, 1993). Involved Low Mach accountants are very much aware of the potential conflict of interest that arises from their participation in managerial decision-making. I thus predict that for this group, pressure to engage in the creation of slack makes the alarm bells start ringing and actually reduces the likelihood that they will act in ways that could be considered unprofessional or unethical. For uninvolved Low Machs on the other hand, it is impossible to predict beforehand whether the conformance effect or the warning effect of pressure will be stronger. This reasoning leads to the following two hypotheses:

**Hypothesis 1:
For High Mach controllers, management pressure increases
the creation of slack for involved controllers but not for
uninvolved controllers.**

Hypothesis 2:
For Low Mach controllers, management pressure decreases the creation of slack for involved controllers but not for uninvolved controllers.

3. Research method

The study consists of a scenario-based experiment. Two independent variables were manipulated by varying the case scenario facts: controller involvement in management and management pressure. Both these variables were manipulated orthogonally, which resulted in four treatment conditions. The third independent variable, Machiavellianism, is a subject-variable, and was measured in an exit questionnaire. Subjects were randomly assigned to treatment conditions. The experimental design thus is a 2 x 2 (involvement x pressure), between subjects factorial design.

The participants in the experiment were 70 students enrolled in a two-year postgraduate educational program leading towards the Dutch equivalent of the Certified Management Accountant (CMA) qualification. Of these 70 participants, 59 (84,3%) were male and 11 were female (15.7%). The participants were between 25 and 47 years old, the mean age being 30.87 years ($n = 69$). All participants had work experience in finance and / or accounting functions and the large majority was currently employed as management accountant or controller.

The students participated in the experiment during class hours. All sessions were scheduled on the same day and during the same time slot to minimize the possibility of communication between participants and preclude imitation of treatments bias (c.f. Shadish, *et al.*, 2002). The participants first read the case scenario and answered the questions used to assess the study's dependent variable. Subsequently they were provided a questionnaire containing manipulation checks, demographic questions and the Mach IV scale (Cristie & Geis, 1970), used to measure their Machiavellianism. The validity and reliability of this scale are well-established (Fehr, *et al.*, 1992; Gunnthorsdottir, *et al.*, 2002). The Mach IV was scored on a five-point scale, in line with recent psychological research (e.g. McHoskey, *et al.*, 1998; Paulhus & Williams, 2002).

The case scenario was specially developed for this study. It describes a situation at a business unit (BU) of a medium-large company. The BU is an investment center and the unit's management team receives a bonus based on the extent to which BU ROI (Return on Investment) exceeds a target level. The management accountant (controller), although a member of the management team, is excluded from this incentive system. The ROI target is established on an annual basis through a process of participative budgeting. The case describes how the BU has changed its strategy recently and continues to remark that the results of this change are disappointing and that it is highly unlikely that the unit will meet its ROI target this year. In October of the present year, the management team of the BU has a meeting about the budget proposal for the next year. At this meeting the BU general manager suggests that the controller comes up with a report that shows an unrealistically low ROI prediction of 11% for the next year, because he does not want the unit to miss its target, and the BU managers to miss their bonus, two times in a row. The accountant needs to decide whether he will accept this task and produce a report that contains unrealistically low estimates of revenues and unrealistically high estimates of costs.

The manipulations of involvement in management and management pressure were embedded in the scenarios. In addition to the common part of the case, participants in the High Involvement conditions read the following statement¹:

“BU controller Wouter Simons has always been very actively involved in the BU's strategic and operational management. He has also contributed substantially to the initiation, development and implementation of Splash's new strategy”

Participants in the Low Involvement conditions instead read:

“BU controller Wouter Simons has never been actively involved in the BU's strategic and operational management. Neither has he contributed in any way to the initiation, development or implementation of Splash's new strategy”

Similarly, participants in the High Management Pressure conditions read:

“Gerard van Dinkel and the other members of the BU management team put severe pressure on BU controller Wouter Simons to agree to a ROI proposal of 11%”

Participants in the Low Management Pressure conditions instead read:

“Gerard van Dinkel and the other members of the Business unit’s management team do not push BU controller Wouter Simons in any way to agree to a ROI proposal of 11% but instead leave the decision for him to make all by himself”

The dependent variable was assessed through two questions. First, participants were asked to indicate the likelihood that Wouter Simons, the BU controller in the case, would go ahead and produce a report that would provide the foundation for an unrealistically low ROI estimate of 11% (“third-person version”). Second, participants were asked to indicate the likelihood that they themselves would produce the report if they were in the position of Wouter Simons (“self version”). For both questions, participants had to indicate their likelihood in percentages between 0% (certainly not do it) and 100% (certainly do it). The “third-person version” was used to control for the effects of social desirability and serves as the main measure of the dependent variable in this study. Asking questions in terms of likelihood of behavior is common practice in experimental (accounting) ethical dilemma studies (e.g. DeZoort & Lord, 1994; Jones & Kavanagh, 1996; Tsui & Gul, 1996) as is framing questions in the third person to prevent social desirability bias (e.g. Ponemon & Gabhart, 1990).

A number of potentially relevant issues were made explicit in the case to prevent participants from speculating, which would have introduced noise in the experiment. First, as mentioned above, it was made clear that the controller was a member of the management team but did not receive BU ROI-based incentive pay. Second, it was made explicit in the case that the controller reported to both the BU general manager and a corporate controller and that the BU manager was not in a position to file sanctions on the controller in case he would choose not to produce the slack inducing report. Third, it was mentioned that BU controller Wouter Simons “was aware that the chance that corporate

headquarters will find out that the ROI proposal of 11% is founded on unrealistically low estimates is negligible". Finally, the case specified that the company and business unit were Dutch and were active in the food and beverages industry and that the company was not listed on a stock exchange.

To assess sample equivalence between treatment conditions I performed a MANOVA with age, years of working experience and Machiavellianism as dependent variables and treatment condition as independent variable. The results show there is no significant difference between treatments for these participant characteristics (Pillai's Trace $F = 1.218$, $p = 0.273$) and thus validate that the procedure to randomize subjects over treatment conditions worked well. The exit questionnaire furthermore contained two items to check the manipulations of the independent variables. Two participants failed to answer the manipulation checks correctly and were removed from the final sample.

4. Results

Descriptive statistics concerning Machiavellianism and the two versions of the study's dependent variable and summarized in Table 1. The hypotheses were tested using ANOVA and moderated regression analysis. The use of these parametric statistical methods requires the data to meet a number of assumptions. The three most important assumptions are independence, normality and homogeneity of variance (e.g. Hair, *et al.*, 1998). First, the independence assumption is met by experimental design. A randomized between-subjects design without opportunities for participants to communicate with each other provides a high level of assurance that observations are independent. Second, a Shapiro-Wilk test indicated that the dependent variable scores were normally distributed in all but one treatment condition (condition 4 with Low Involvement and Low Pressure, $S-W = 0.882$, $p = 0.034$). Observation of the histogram suggested that the assumption in this condition was violated because the data was positively skewed. Because ANOVA is robust to moderate violations of the normality assumption as long as they are not caused by outliers (Hair, *et al.*, 1998), no further steps were taken to correct for non-normality.

Finally, the assumption of homogeneity of variance was assessed with a Levene test. This showed that the Levene statistic was insignificant ($F = 0.402$, $p = 0.752$) and that therefore the variance in the dependent variables' scores can be assumed to be equal across groups.

--- Insert Table 1 about here ---

For hypotheses testing using ANOVA, I split the sample in two subgroups: High Machs and Low Machs. The sample was split at the median Mach IV score of 2.80. This procedure resulted in two subgroups of 34 participants eachⁱⁱ. Table 2 shows how the treatment conditions were distributed over the two Machiavellianism subgroups resulting in eight cells. Although the number of participants per cell is generally similar, there is a notable difference between the smallest cell (cell 6: $N = 5$) and the biggest cell (cell 5: $N = 11$). Moreover, the number of participants per cell overall is low, which substantially limits the power of the tests (Hair, *et al.*, 1998). Analyses show the assumptions of normality and equality of variance do generally hold for these eight cells. Concerning normality, the Shapiro-Wilk (S-W) test is insignificant for all eight cells and the same goes for Levene's test regarding the equality of variance.

--- Insert Table 2 about here ---

The results of a factorial ANOVA with Machiavellianism dichotomized as a third factor are in Table 3. This table shows the model as a whole is insignificant ($F = 1.707$, $p = 0.125$), just as the main effects and the two-way interaction effects. The three-way interaction effect however is highly significant ($F = 10.120$, $p = 0.002$, partial $\eta^2 = 0.144$).

--- Insert Table 3 about here ---

To gain a better understanding of the nature of this interaction, separate ANOVA's are run for the High Mach and the Low Mach subsample. Considering the High Mach sample, Hypothesis 1 predicts a positive interaction effect of pressure and involvement

on slack creation. Panel A of Table 4 shows the results of a factorial ANOVA for the High Mach subsample. From this table it is clear that both main effects and the model as a whole are insignificant. The interaction effect of pressure and involvement is significant however ($F = 5.019, p = 0.033, \text{partial } \eta^2 = 0.143$). The data thus support Hypothesis 1. This result is illustrated in Figure 1. This figure indicates management pressure increased engagement in gaming for involved controllers only. For uninvolved controllers, slack creation was even lower in case of management pressure.

Considering the Low Mach sample, Hypothesis 2 predicts a negative interaction effect of pressure and involvement on slack creation. Panel B of Table 4 presents the results of a factorial ANOVA for the Low Mach subsample. This table shows that, just as for the High Mach sample, both main effects and the model as a whole are insignificant. The interaction effect of pressure and involvement again is significant however ($F = 5.145, p = 0.031, \text{partial } \eta^2 = 0.146$), supporting Hypothesis 2. This result is illustrated in Figure 2. This figure indicates management pressure decreased engagement in gaming for involved controllers only. For not-involved controllers, engagement in gaming is actually higher in the High pressure condition than in the Low pressure condition. The results for the Low Mach sample are thus exactly opposite to those of the High Mach sample.

--- Insert Table 4 about here ---

--- Insert Figure 1 about here ---

--- Insert Figure 2 about here ---

In addition to the ANOVA's, the hypotheses are also tested using moderated regression analysis. A linear regression was run with the two manipulations and Machiavellianism as independent variables. In the ANOVA's above, a dichotomized version of Machiavellianism was used, implicating a loss of potentially relevant information (c.f. Hartmann & Moers, 1999). For the regression analysis, the original Machiavellianism scores were retained. The regression model tested is specified in equation (1):

$$Y = \mathbf{b}_0 + \mathbf{b}_1 X_1 + \mathbf{b}_2 X_2 + \mathbf{b}_3 X_3 + \mathbf{b}_4 (X_1 \times X_2) + \mathbf{b}_5 (X_1 \times X_3) + \mathbf{b}_6 (X_2 \times X_3) + \mathbf{b}_7 (X_1 \times X_2 \times X_3) + \epsilon \quad (1)$$

where $Y = \textit{creation of slack}$ as measured by the DV, $X_1 =$ a dummy variable that equals 1 if *involvement in management* is High and 0 if it is Low, $X_2 =$ a dummy variable that equals 1 if *management pressure* is High and 0 if it is Low, and $X_3 = \textit{Machiavellianism}$ (standardized to have mean 0 and variance 1). The results of the regression analysis are in Table 5. The model as a whole again is insignificant ($F = 0.785$, $p = 0.0602$, adjusted $R^2 = -0.023$). Besides the intercept, the coefficient of the three-way interaction is the only significant coefficient in the model (Standardized $\beta = 0.564$, $t = 2.05$, $p = 0.045$) as was predicted by hypotheses 1 and 2.

--- Insert Table 5 about here ---

The hypothesis tests above are based on the “third-person version” of the study’s DV to control for social desirability bias. The data seem to confirm the existence of a tendency to answer socially desirable, as the mean score on the “self” version of the DV is 34.04%, which is 15 percentage points below the “third-person” version (mean = 49.04%). A paired sample t -test indicates this difference is significant ($t = 8.106$, $p = 0.000$). Care should be taken in interpreting this difference however, because both items were next to each other in the questionnaire and this might have induced a demand effectⁱⁱⁱ. Although the mean score for the two versions thus differs significantly, the data otherwise shows a very similar pattern. To illustrate, the results of an ANOVA with Machiavellianism as a third factor and the “self version” as dependent variable also show that only the three-way interaction effect is significant ($F = 10.785$, $p = 0.002$, partial $\eta^2 = 0.152$). However, whereas for the “third-person version” the model as a whole was insignificant, it is marginally significant for the “self” version ($F = 1.904$, $p = 0.085$).

5. Discussion and conclusion

This paper reports about an experiment that was used to test whether and how management accountants' involvement in management interacts with management pressure and the personality characteristic of Machiavellianism in affecting the creation of budget slack. Based on theory and findings in the psychology, accounting and business ethics literatures it was expected that involvement and pressure would interact differently for more and less Machiavellian management accountants. The following hypotheses were tested:

Hypothesis 1:

For High Mach controllers, management pressure increases gaming for involved controllers but not for uninvolved controllers.

Hypothesis 2:

For Low Mach controllers, management pressure decreases gaming for involved controllers but not for uninvolved controllers.

The results of the experiment confirm the existence of a three-way interaction effect. They also suggest however, that the interaction might be more complex than was hypothesized. Instead of ordinal interaction effects, disordinal interaction effects were found in both the High Mach and Low Mach subsample. Considering the High Mach subsample, pressure increased the likeliness of slack creation for involved management accountants, however, it also *decreased* chance of slack for uninvolved accountants. For Low Mach participants, pressure decreased the likeliness of slack creation for involved accountants as was predicted; however it also *increased* the chance of slack for uninvolved controllers. It should be kept in mind though that none of the differences between the dependent variable mean scores of the cells were significant. The cause for this lack of significance is likely to be the low power of the test resulting from the limited

number of participants. It would take a more powerful test to draw definite conclusions about the exact form of the interaction.

Nonetheless, the findings of this study are interesting for management accounting research and practice. First, the study suggests that there is no universal effect of management accountants' involvement in management on their engagement in the creation of budget slack. This finding is important because it contradicts a widely held belief that affects the way in which organizations design their management accounting functions (Sathe, 1978; Anthony, 1988). If controller involvement in management as such does not increase the likeliness of slack creation, the apparent trade-off that organizations face in deciding about the tasks and responsibilities of their controllers, in particular controllers working for decentralized business units, is not as problematic as is sometimes proclaimed (c.f. Sathe, 1978; Hopper, 1980; Anthony & Govindarajan, 1998; Indjejikian & Matejka, 2006). Organizations might very well be able to reap the benefits of controller involvement in management, in the form of better-informed business decisions (Sathe, 1982; Chapman, 1998; Pierce & O'Dea, 2003), without incurring the costs of loosened control. One important caveat to the conclusion that controller involvement in management is less harmful than is often believed, is that the experiment did show that involvement changes the way in which controllers react to social pressure by managers. Only relatively Machiavellian controllers however were more likely to give in to pressure to engage in the creation of slack if they had been involved in management. For low Machiavellians involvement even reduced the likeliness that such pressure was effective.

A second important conclusion is that management pressure to engage management accountants in the creation of budget slack is not always effective (c.f. Davis, *et al.*, 2006). It was argued that pressure can have a (positive) conformance and a (negative) warning signal effect on the engagement of management accountants in the creation of slack. The conformance effect was stronger than the warning signal effect for involved Machiavellians, as was hypothesized, but also for uninvolved accountants scoring relatively low on Machiavellianism. This final result is puzzling but might be an artifact of the research design. Future research should find out whether this result is robust in other settings that allow for more powerful tests.

The warning signal effect was dominant for involved accountants scoring relatively low on Machiavellianism but also for uninvolved High Machiavellians. This final result might be explained by the fact that Machiavellians opportunistically trade-off the expected benefits of engaging in the creation of slack. For uninvolved accountants there is little to win with the creation of slack, so the benefits of appearing an independent professional by refusing engagement in gaming, are likely to outweigh the costs.

Finally, the finding that controller personality characteristics such as Machiavellianism are important in the prediction of slack creation is relevant for organizations because it stresses the importance of selection mechanisms such as assessment centers. For example, the best way to identify “strong controllers” (i.e. controllers operating successful in positions with dual responsibility, c.f. Sathe, 1982) might be through a personality test including measures such as the Mach IV scale for Machiavellianism. The relevance of individual differences in explaining gaming behavior should also be taken into account by universities and professional organizations contributing to the education and professional development of controllers. Although Machiavellianism is sometimes seen as a stable and unchangeable personality characteristic (e.g. Paulhus & Williams, 2002), there is also evidence that training affects Machiavellianism and can change individuals’ level of moral reasoning (c.f. Cristie & Geis, 1970; Fehr, *et al.*, 1992; McLean & Jones, 1992). The findings of this study thus stress the importance of ethics and personal development in management accounting educational curricula.

In interpreting this study’s results, it should be taken into account that it has a number of serious limitations. First, the data for this study were acquired through an experimental survey in a controlled classroom setting. Although the controlled setting contributes to the internal validity of the study, it limits the generalizability of the results to the real world. Furthermore, the fact that the study used a case-based experimental survey with the manipulations embedded in the scenario provides concerns with respect to construct validity and generalizability. Despite the effort to make the scenario as realistic as possible, participants’ answers might still have been influenced by the artificial setting imposed on them. Two specific causes of differences between answers to

the DV questions and behavior in real world settings are cognitive limitations and social desirability. Cognitive limitations make it difficult for participants to determine what their behavior would be in situations described in case scenario's (Grover, 1993). Social desirability is a concern in this study because participants were asked about the likeness of behavior that is generally considered unethical or unprofessional.

Finally, it should be noted that although most participants had work experience in management accounting functions, at the time of the experiment some were working in other positions. Also, all participants were students of a postgraduate educational program and their average age was 30.87 years, which is relatively young. The findings of this study might thus be biased towards relatively inexperienced controllers and moreover, because all participants were working in the Netherlands, towards the Dutch cultural and institutional setting.

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Table 1 Descriptive statistics

<i>Variable</i>	<i>Treatment condition</i>		<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
DV “third person” version	1	High Involvement & High pressure	18	47.777	25.566	5	90
	2	High Involvement & Low pressure	15	47.333	24.339	5	90
	3	Low Involvement & High pressure	18	53.056	23.335	15	100
	4	Low Involvement & Low pressure	17	47.647	23.593	10	75
	Total		68	49.044	23.804	5	100
DV “self” version	1	High Involvement & High pressure	18	30.278	25.407	0	70
	2	High Involvement & Low pressure	15	37.333	24.776	5	80
	3	Low Involvement & High pressure	18	33.889	24.348	0	90
	4	Low Involvement & Low pressure	17	35.294	22.394	0	65
	Total		68	34.044	23.851	0	90
Machiavellianism	1	High Involvement & High pressure	18	2.758	0.302	2.15	3.40
	2	High Involvement & Low pressure	15	2.907	0.287	2.35	3.25
	3	Low Involvement & High pressure	18	2.772	0.352	2.25	3.30
	4	Low Involvement & Low pressure	17	2.818	0.234	2.45	3.20
	Total		68	2.810	0.297	2.15	3.40

Table 2 Number of participants per cell

		Machiavellianism High		
		Involvement		
		High	Low	Total N
Pressure	High	<i>Cell 1</i> (N = 7)	<i>Cell 3</i> (N = 8)	15
	Low	<i>Cell 2</i> (N = 10)	<i>Cell 4</i> (N = 9)	19
	Total N	17	17	34
		Machiavellianism Low		
		Involvement		
		High	Low	Total N
Pressure	High	<i>Cell 5</i> (N = 11)	<i>Cell 7</i> (N = 10)	21
	Low	<i>Cell 6</i> (N = 5)	<i>Cell 8</i> (N = 8)	13
	Total N	16	18	34

Table 3 Results of three factor full sample ANOVA

<i>Source</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial η^2</i>
Corrected Model	6304.597	7	900.657	1.707	0.125	0.166
Intercept	160494.621	1	160494.621	304.176	0.000	0.835
Involvement	4.049	1	4.049	0.008	0.930	0.009
Pressure	151.008	1	151.008	0.286	0.595	0.000
Machiavellianism	295.148	1	295.148	0.559	0.457	0.005
Involvement * Pressure	75.375	1	75.375	0.143	0.707	0.001
Involvement * Machiavellianism	30.989	1	30.989	0.059	0.809	0.002
Pressure * Machiavellianism	61.192	1	61.192	0.116	0.735	0.002
Involvement * Pressure * Machiavellianism	5339.697	1	5339.697	10.120	0.002	0.144
Error	31658.271	60	527.638			
Total	201525.000	68				
Corrected Total	37962.868	67				

R Squared = .166 (Adjusted R Squared = .069)

Table 4 Results factorial ANOVA for High Mach and Low Mach subsamples

Panel A Results factorial ANOVA for High Mach subsample

<i>Source</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial η^2</i>
Corrected Model	2345.352	3	781.784	1.822	0.164	0.154
Intercept	90643.125	1	90643.125	211.288	0.000	0.876
Involvement	29.828	1	29.828	0.070	0.794	0.002
Pressure	210.027	1	210.027	0.490	0.490	0.016
Involvement * Pressure	2153.067	1	2153.067	5.019	0.033	0.143
Error	12870.089	30	429.003			
Total	104775.000	34				
Corrected Total	15215.441	33				

R Squared = 0.154 (Adjusted R Squared = 0.070)

Panel B Results factorial ANOVA for Low Mach subsample

<i>Source</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	<i>Partial η^2</i>
Corrected Model	3605.936	3	1201.979	1.919	0.148	0.161
Intercept	70880.453	1	70880.453	113.178	0.000	0.790
Involvement	6.091	1	6.091	0.010	0.922	0.000
Pressure	9.616	1	9.616	0.015	0.902	0.001
Involvement * Pressure	3222.303	1	3222.303	5.145	0.031	0.146
Error	18788.182	30	626.273			
Total	96750.000	34				
Corrected Total	22394.118	33				

R Squared = 0.161 (Adjusted R Squared = 0.077)

Figure 1 Results factorial ANOVA High Mach subsample

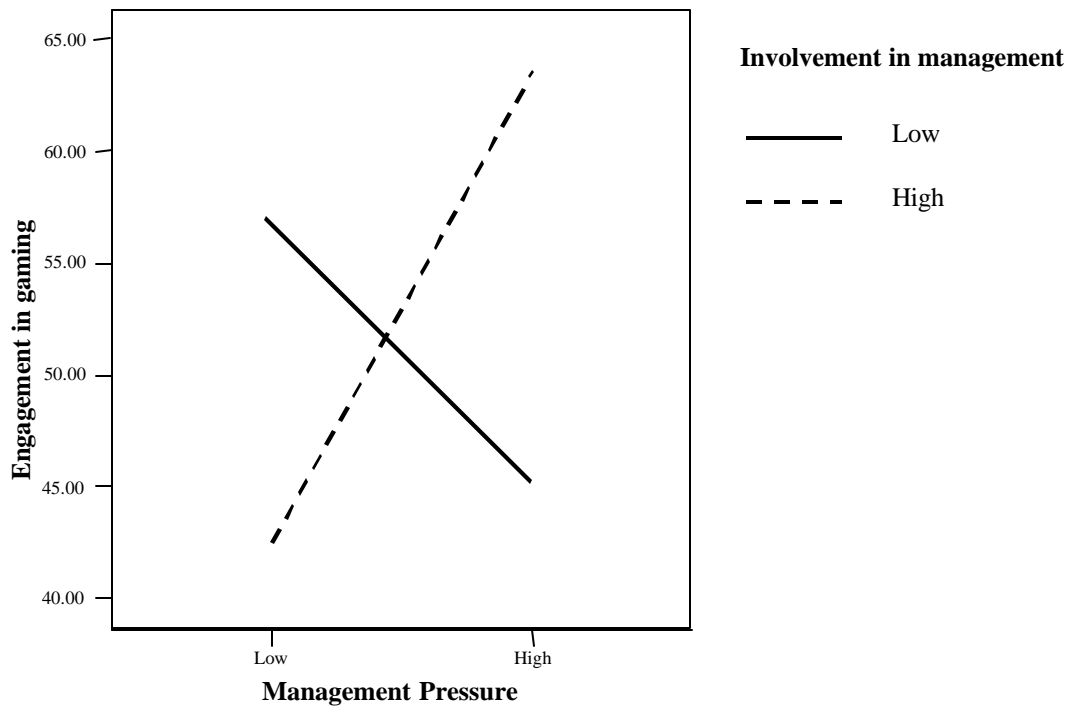


Figure 2 Results factorial ANOVA Low Mach subsample

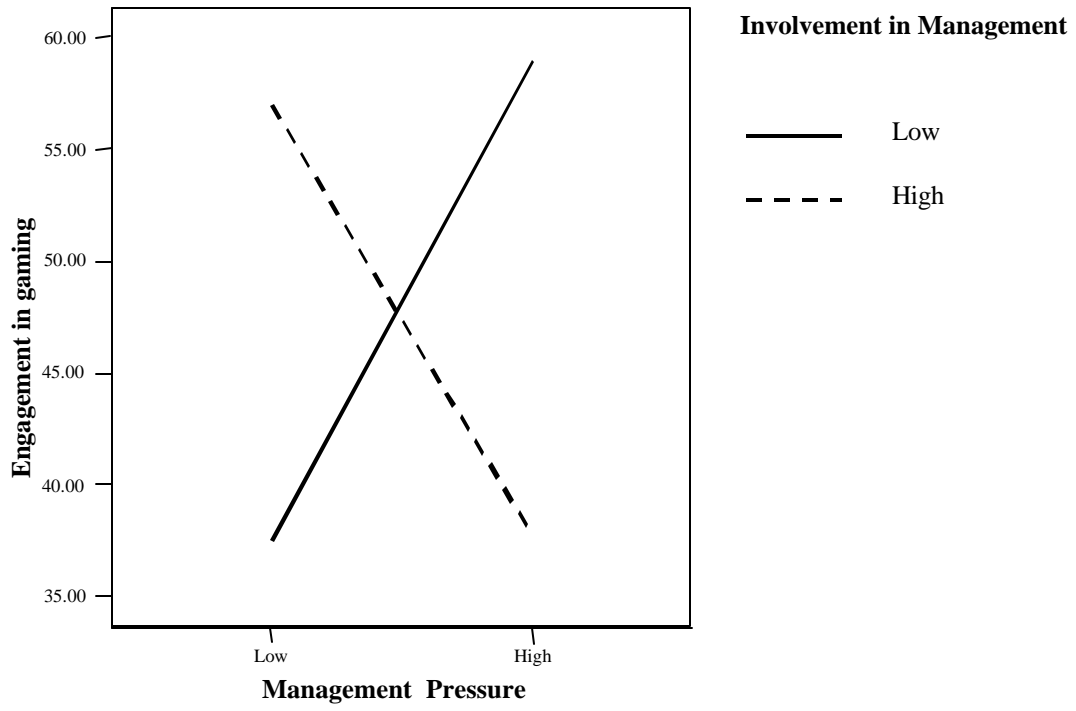


Table 5 Results moderated regression analysis**Model Summary**

	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>
	0.290	0.084	-0.023	24.075

ANOVA

	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Regression	3185.388	7	455.055	0.785	0.602
Residual	34777.480	60	579.625		
Total	37962.870	67			

Coefficients

	<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>		
Intercept	47.444	5.843		8.120	0.000
Involvement in management	1.423	8.804	0.030	0.162	0.872
Management Pressure	4.772	8.169	0.101	0.584	0.561
Machiavellianism	7.443	7.633	0.313	0.975	0.333
Involvement * Pressure	-4.633	11.970	-0.087	-0.387	0.700
Involvement * Machiavellianism	-12.127	10.120	-0.357	-1.198	0.236
Pressure * Machiavellianism	-14.108	9.084	-0.469	-1.553	0.126
Involvement * Pressure * Machiavellianism	25.903	12.635	0.564	2.050	0.045

ⁱ Note that in the scenario “Splash” was the name of the business unit, “Wouter Simons” was the name of the BU controller and “Gerard van Dinkel” was the name of the BU’s general manager.

ⁱⁱ The results of an ANOVA indicated that these two subgroups did not differ significantly in terms of age, work experience, experience with gaming or treatment condition.

ⁱⁱⁱ The scores on the “self” version might have been higher, had the questionnaire not explicitly contrasted it to the “third person” version.