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TOO MUCH OF A GOOD THING? NEGATIVE EFFECTS OF HIGH TRUST AND INDIVIDUAL AUTONOMY IN SELF-MANAGING TEAMS

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A high level of trust can make the members of self-managing work teams reluctant to monitor one another. If low monitoring combines with high individual autonomy, team performance can suffer. Data from 71 self-managing teams of MBA students demonstrated this effect. High trust was associated with higher team performance when individual autonomy was low but with lower performance when individual autonomy was high. Additional analysis showed a moderated mediating role of monitoring and autonomy in the relationship between trust and performance.

Doveryai, no proveryai. ("Trust but verify.")

- Old Russian proverb

Trust is commonly accepted as having a variety of positive effects (Kramer, 1999; Kramer & Tyler, 1996), and research has focused on exploring these benefits. In every one of 43 empirical studies reviewed by Dirks and Ferrin (2001), trust was expected to result in benefits to individuals or their organizations. These expected benefits included improved communication, more organizational citizenship behaviors, less competitive behavior in negotiations, higher group performance, less conflict, and greater job satisfaction. However, while the effects of trust on attitudes and perceptions have been found to be fairly consistent and positive, its effects on behavior and performance have been "weaker and less consistent" (Dirks & Ferrin, 2001: 455), suggesting that trust might exert a moderating rather than a direct effect on performance outcomes.

The lack of "main effects" is particularly pronounced in teams and groups. Neither Friedlander (1970), Kegan and Rubinstein (1973)), nor Dirks (1999) could demonstrate any significant effect of intragroup trust on group performance. Only moderating (or interactive) effects of trust, not direct effects, were significant in two studies (Dirks, 1999; Simons & Peterson, 2000), and only Dirks (1999) focused directly on team performance as an outcome.

In this study, I explored how trust and monitoring interacted with individual autonomy to affect performance in self-managing teams. I depart from the tradition of searching for positive effects by examining a more counterintuitive situation in which higher levels of trust might be actually associated with lower team performance. It was not my intent to suggest that trust does not have benefits in teams, but rather to explore boundary conditions and contingencies under which high trust in teams can be harmful. I suggest that self-managing teams with high levels of individual autonomy will perform better when trust is lower than when trust is high.

Self-managing teams, defined as groups of interdependent individuals that can self-regulate on relatively whole tasks (Cohen, Ledford, & Spreitzer, 1996), present a setting in which issues of trust and autonomy are of primary importance. At the heart of a self-managing team is the discretion team members have in deciding how to carry out tasks and allocate work within the team. This discretion includes decisions that have traditionally been made at managerial levels (Wellins, Wilson, Katz, Laughlin, Day, & Price, 1990), such as how much autonomy to give to different team members and how much to monitor them. Autonomy is defined as the amount of freedom and discretion an individual has in carrying out assigned tasks (Hackman, 1983). I believe that the interaction between the amount of autonomy and the amount of monitoring in a team reveals a negative effect of trust on team performance. Figure 1 illustrates my overall model.

In exploring both team- and individual-level concepts, it is important to specify the level of analysis. In this study, the team was the focal unit (Rousseau, 1985), or level of theory (Klein, Dansereau, & Hall, 1994). I expected that their team could affect individuals; for example, social pressure might in-

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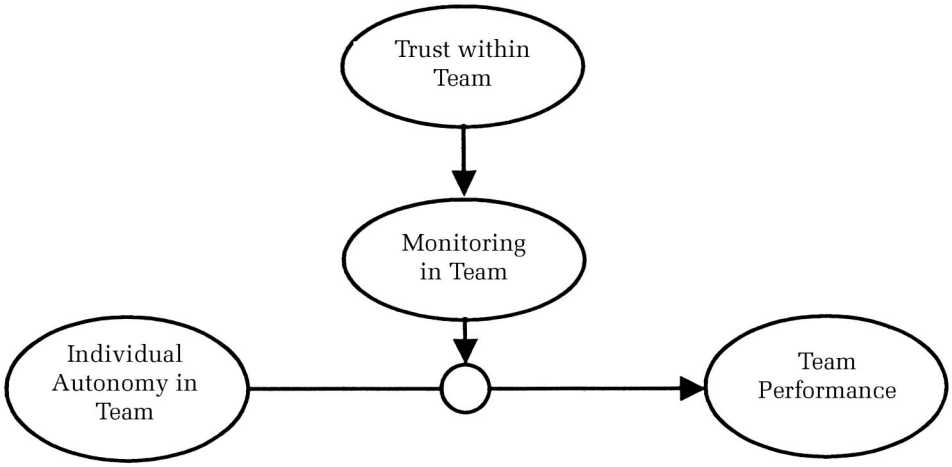
FIGURE 1
Overall Model



fluence individual decisions on how much to monitor other team members. I also expected that aggregated individual effects could affect a team—for example, the average levels of monitoring and of individual autonomy in a team might influence team performance.

In organizations, management decisions about how much to monitor individual employees are in part (or in whole) based on trust. Trust is defined as a willingness to be vulnerable to the actions of another party (Mayer, Davis, & Schoorman, 1995) in situations involving some risk (Deutsch, 1958), factors such as benevolence, honesty, and competence are often perceived as indicative of trustworthiness. In general, the more trustworthy employees are perceived to be, the less an organization will monitor them (Creed & Miles, 1996), and the less trust in its employees an organization has, the more management feels it must monitor (Bromiley & Cummings, 1995). In a team setting, monitoring is defined as the team members' surveillance and awareness of other team members' activities, and intrateam trust is the aggregate perception of trustworthiness that team members have about one another. In a team, as in an organization, an inverse relationship between trust and monitoring is expected to operate. High levels of intrateam trust are expected to be associated with low levels of monitoring, and low levels of trust are expected to be associated with high levels of monitoring.

In self-managing teams, however, where team members are responsible for the monitoring, members may choose to not monitor one another when the level of trust is high. In such teams, social forces may make it difficult for individual team members to suggest the necessity of monitoring one another once a high level of trust is established. Because of the perception that monitoring results from a lack of trust, such a suggestion could be perceived as critical of other team members, and thus risks sanction and rejection by the team (Feldman, 1984). Teams in general, and particularly those high in characteristics like cohesiveness and trust, can exert a powerful influence on individuals to conform (Baron, Vandello, & Brunsman, 1996), and such teams are also especially susceptible to group decision biases like "groupthink" (Janis, 1982). The generally negative connotations of monitoring and surveillance and the negative effect they can have on individual motivation (Enzle & Anderson, 1993) are expected to discourage individual team members from suggesting monitoring. An individual team member might also be concerned that a suggestion to monitor fellow team members could be perceived as a violation of trust itself, leading to anger, hurt, and fear on the part of the team members who perceive a violation (Lewicki & Bunker, 1996). This argument suggests a number of dynamics may occur in self-managing teams in which trust is high that will not occur in either self-managing teams in which trust is lower or in manager-led teams or work groups. These unique dynamics will occur as individual team members struggle with the decision about whether or not to suggest (or support) greater monitoring in their team. Factors such as the desire to be perceived as a "team player" and to conform, the fear of sanction or punishment, and concern for the feelings of fellow team members will all influence the aggregate decision of a self-managing team as each member struggles with these factors. A manager deciding on how much to monitor a comparable work group, on the other hand, would not be susceptible to these pressures.

In both self-managing teams and manager-led work groups, low trust will generally be associated with higher monitoring, and high trust will be associated with lower monitoring (that is, they will have a negative relationship). However, the above mechanisms suggest an additional reluctance among members of a self-managing team to implement and enforce monitoring. I would expect this reluctance to grow as trust increases, and the corresponding potential costs and risks of suggesting or endorsing monitoring will also become greater and more salient to team members. Thus, while a relatively linear negative relationship between trust and monitoring is expected in a manager-led team or work group, in a self-managing team, the relationship is likely to be nonlinear. The level of monitoring is expected to drop off more rapidly than in a manager-led work group as trust increases and the pressures on team members to not monitor one another grow.

In other words, the higher the level of trust, the more reluctance there will be on the part of members of a self-managing team to express their desire for monitoring in the team, and instead there will be a tendency to suppress the public expression of that desire. In combination with conformity and groupthink pressures, these tendencies will lead to less monitoring at higher levels of trust than what one would normally expect in a manager-led team or work group.

At relatively low levels of trust, however, there is little reason to expect that members of a self-managing team will be similarly reluctant to express their desire for monitoring. Under conditions of low trust, a team likely has little cohesiveness and power to collectively sanction or punish individuals for suggesting greater monitoring, and team members are much less likely to perceive a trust violation if trust is already low. The mechanisms that can suppress team members' expression of their desire for monitoring when trust is high will not be as effective when trust is lower. Thus, there is likely to be little difference in the amounts of monitoring implemented by a self-managing team in which trust is low and a manager-led team or work group. In fact, Barker (1993) found that self-managing teams could become quite draconian in their monitoring and controlling behavior when trust was perceived to be low.

While the mechanism is rooted in individual perception and behavior, the outcome is clearly a team-level phenomenon (as with other team phenomena, like groupthink and conformity). The suppression of monitoring that is likely only when trust is higher suggests that the linear relationship one might expect between trust and monitoring in a manager-led work group is not going to occur in a self-managing team. Rather, the relationship should be nonlinear, albeit still negative. The nonlinear relationship that best captures expectations based on the arguments above is a predominantly negative, concave, downward curve.

Hypothesis 1. The relationship between the level of intrateam trust and the amount of monitoring reported in a team will be negative and nonlinear.

In the management-employee relationship, some monitoring is always necessary. According to Powell (1996), even when employees can be trusted enough for management to grant them autonomy, there is still a need to monitor those employees. Sabel (1993) pointed out that in addition to reducing the likelihood and possibility of duplicity, monitoring also routinizes contact between parties: "Cooperation is buttressed by sustained contact, regular dialogue, and constant monitoring" (1993: 63). According to agency theory, monitoring protects against individuals' opportunism and self-interest (Eisenhardt, 1989), but stewardship theory suggests that the assumption of individual opportunism and self-interest is not always appropriate (Davis, Schoorman, & Donaldson, 1997). Although some evidence indicates that surveillance negatively affects individual motivation (Enzle & Anderson, 1993), most research has supported the performance benefits of monitoring (Larson & Callahan, 1990).

Monitoring in teams is expected to be similarly related to performance, not only for the above individual-level reasons, which are consistent with reducing the incidence of free riding and social loafing in teams (Baron, Kerr, & Miller, 1992), but also because monitoring is expected to increase coordination and reduce process loss (Saavedra, Earley, & Van Dyne, 1993). The more team members are aware of each others' activities, the better they can coordinate their work. Ironically, this formulation suggests that the "ideal" relationship between trust and monitoring is quite different from what is likely to occur in a self-managing team—namely, that a certain level of monitoring is necessary no matter how high the trust within a team becomes.

This relationship becomes crucial to team performance when combined with the level of individual autonomy in a team. The more individual autonomy there is in a team, the more team members will be working independently of one another, and the more monitoring and communication will be necessary to avoid potential coordination and process losses (Orton & Weick, 1990). Individual autonomy

is generally expected to have a positive effect on performance, on the basis of Hackman and Oldham's (1976) job characteristics model, and the logic that decision-making power should be in the hands of the individuals with most information about a task (Locke & Schweiger, 1979). However, I suggest that such a positive relationship is contingent on the level of monitoring within a team and that the autonomy-performance relationship can become negative if monitoring is insufficient. In other words, high levels of individual autonomy in a team should be accompanied by relatively high levels of monitoring, and insufficient monitoring could lead to lower performance. This statement implies the following interaction between monitoring and autonomy:

Hypothesis 2. Individual autonomy and monitoring will interact in such a way that teams with high individual autonomy and low monitoring will have lower performance than teams with high individual autonomy and high monitoring.

The logic outlined above in Hypotheses 1 and 2 suggests that monitoring mediates the effect of trust on performance. In other words, if trust affects monitoring, and monitoring affects performance, trust and performance must have an indirect relationship, carried (in part or in full) by monitoring. The fact that the relationship between monitoring and performance is also expected to depend on the level of autonomy (the interaction in Hypothesis 2) complicates the mediation. The overall model, as shown in Figure 1, describes "moderated mediation" (Baron & Kenny, 1986; James & Brett, 1984) in which the relationship between the mediator and the outcome variable is moderated by another variable. In this particular case, trust affects monitoring (the mediator), which interacts with autonomy (the moderator) to affect performance. To support the overall model, it is therefore necessary to establish this moderated mediation and show that the indirect effect of trust on performance is carried through monitoring and its interaction with autonomy.

METHODS

Setting

The research participants were two complete cohorts of MBA graduate students organized in self-managing teams at the business school of a private midwestern university. Students were assigned to teams and worked in them for four months, to perform a wide variety of tasks (including financial analyses, marketing projects, statistical problem sets, business case write-ups, presentations, and longer papers and projects) pertaining to eight classes. During a week of orientation, team members performed a number of team-building activities, followed immediately by the start of classes. The teams were self-managing and had complete discretion in deciding how to carry out assignments. Teams were not formally evaluated on their processes or methods for carrying out assignments, but only on the quality of their output. Team placements were based on criteria designed to maximize heterogeneity on gender, nationality, educational background, and work experience. Every team had four members, both genders, at least two nationalities, and at least three different undergraduate majors. This even distribution provided a limited methodological control for some demographic variables in that it reduced the need to include those variables as controls in the statistical analyses and further limit degrees of freedom.

Upon completion of classes, all teams were required to participate in a series of four case competitions. They were given 24 hours after receiving each case to create analyses and recommendations to present to a panel of faculty and industry experts, who evaluated their performance. The case competition was a central part of the school's MBA curriculum, and students were told throughout the preceding semesters that it was the culmination of the required coursework. Winners of the competition enjoyed prestige and recognition, in addition to various prizes. The data were collected during this week of case competition for each class, and the questionnaire specifically referred to teams' activities during the competition. Teams were dropped from the analysis if fewer than half the team members responded to the surveys.

Participants

There were 300 participants in 76 teams. Data from 35 teams were collected from one incoming class of 135 students, and data from 41 additional teams were collected from the following class of 165 students. A response rate of 83 percent yielded 248 respondents, representing 71 teams. Of the respondents, 21.6 percent were women, and 78.4 percent were men. U.S. citizens comprised 66.5 percent of the respondents, with the largest non-U.S. contingents made up of Chinese, Indian, Japanese, and Korean nationals (in order of representation). The average age was 29.4 years; the youngest individual was 22, and the oldest was 47. Undergraduate degrees spanned a variety of majors, with the most common being business, social science, engineering, and economics. Participation was com-

pletely voluntary and was not linked to course credit or financial reward. There were no significant differences between the two cohorts of MBA students on any variables, and the case competition, timing, data collection, and measures were identical for both cohorts.

Measures

Measures in this study consisted of performance measures rated by a panel of experts, survey questionnaires filled out by team members, and archival individual data.

Individual ability. This was measured by students' GMAT scores, which were obtained from school records, not self-reported.

Team performance. This was measured by performance during the case competition and was the average of the numerical ratings made by a minimum of six raters who witnessed the presentation of teams' case analyses and had the opportunity to question the teams. The raters were faculty, industry experts, former students, and communication specialists. Each rater assigned points on six different dimensions of a team's performance, including the analysis, presentation, and the performance of the team in a question-and-answer session.

The survey questionnaire assessed a number of constructs using multi-item scales. Appendix A gives the scale items and factor analysis results.

Intrateam trust. This four-item scale, based on Simons and Peterson's (2000) scale, had a Cronbach alpha of .83 and a mean intraclass correlation coefficient (ICC) of .80.

Individual autonomy. This three-item measure, based on Breaugh's (1989) scale, had a Cronbach alpha of .84 and a mean ICC of .81. This measure is the mean level of individual autonomy reported by individual team members.

Monitoring. This four-item measure, based on Cummings and Bromiley's (1996) scale, had a Cronbach alpha of .81 and a mean ICC of .85.

Analysis

To test the interaction effect hypothesized, I used the multiplicative product of the variables in hierarchical multiple regression analyses, as Baron and Kenny (1986) recommended. Change in the amount of variance explained (ΔR^2) is the most appropriate test of the significance of an interaction term (Cohen & Cohen, 1983). Interactions were plotted by deriving separate equations for the high and low (one standard deviation above and below the mean) conditions, as recommended by Aiken and West (1991). Because the regression analyses involved interactions, the "main effect" terms and product terms could be highly correlated, raising the issue of multicollinearity, which can make regression coefficients unstable and difficult to interpret (Cohen & Cohen, 1983). Variables in the study were thus centered to reduce multicollinearity (Aiken & West, 1991).

The moderated mediation underlying the model was tested via a series of hierarchical regressions based on the four steps recommended by Baron and Kenny (1986). The goal of step 1 was to establish the relationship between trust and performance in the absence of monitoring (the mediator). In the same manner that monitoring and autonomy should interact to influence performance, trust and autonomy should interact when monitoring is not included in the model. The second step was demonstrating the relationship between trust and monitoring. The third step was establishing the relationship between monitoring and performance (in this case, also interacting with autonomy), and the fourth step was demonstrating that the effect of the initial variable (the interaction of trust and autonomy) was reduced or insignificant when the mediator (the interaction of monitoring and autonomy) was added to the model. Appendix B discusses this analysis in greater detail.

RESULTS

The values of the intercorrelation coefficients confirmed the appropriateness of aggregation for intrateam trust, monitoring, and individual autonomy. As a check for multicollinearity, variance inflation factor (VIF) scores were calculated for the variables in each regression model. All VIF scores were below 4, and most were below 2, suggesting that multicollinearity was not a serious problem in the analysis.

Table 1 provides means, standard deviations, scale reliabilities, and correlations.

Hypothesis 1 predicts a negative, nonlinear relationship between the levels of trust and monitoring in teams. Since testing this relationship was part of the mediation analysis (Baron & Kenny, 1986), the results are shown in Table 2 under "Mediation Step 2." The relationship shown there is significant and negative ($t_{68} = -8.35$, $p < .01$), establishing a negative relationship between trust and monitoring. (This result also satisfied step 2 of the four-step mediation analysis.)

Demonstrating the nonlinear (concave downward) relationship required two things. First, an additional regression equation (or hierarchical step) had to be run with the trust variable squared added. The beta weight had to be significant, and

TABLE 1
Means, Standard Deviations, Scale Reliabilities, and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6
1. Age	29.55	1.90	n.a.					
2. GMAT[b]	0.0	1.0	−.09	n.a.				
3. Performance	140.03	15.48	.01	.05	n.a.			
4. Autonomy	6.40	1.02	−.07	.10	−.52**	.84		
5. Trust	7.05	1.11	−.08	−.01	−.10	.07	.83	
6. Monitoring	5.04	1.36	.09	.09	.14	−.09	−.71**	.81

[a] $n = 71$.
[b] Graduate Management Achievement Test; standardized score.
** $p < .01$

the change in variance explained from one equation (step) to the next also had to be significant. This is also shown in "Mediation Step 2" in Table 2, with a significant beta weight ($t_{67} = -2.19$, $p < .05$) and a significant change in the explained variance ($p < .05$) Second, to confirm the existence of a downward concave curve (as opposed to another curvilinear relationship), both the coefficients of the main term and of the squared term had to be shown to be negative (Aiken & West, 1991). The results also confirm this condition. The data plotted in Figure 2 confirm that (1) there is a nonlinear relationship, and (2) the relationship is a concave downward curve (the shaded line illustrates the nonlinear trend of the data). Overall, there is support for Hypothesis 1.

Hypothesis 2 predicts that autonomy and monitoring interact in such a way that teams with high levels of individual autonomy and low levels of monitoring will perform worse than teams with high levels of autonomy and high levels of monitoring. The testing of Hypothesis 2 was step 3 of the mediation test (Baron & Kenny, 1986). The results are illustrated in "Mediation Step 3 and 4" in Table 2, in which the monitoring by autonomy term is significant ($t_{63} = 2.65$, $p < .05$), with trust, monitoring, autonomy, and the trust by autonomy interaction controlled. If a change in explained variance (ΔR^2) is calculated for the addition of the monitoring by autonomy interaction term, it is also significant ($\Delta F_{64,\ 1} = 7.01$, $p < .05$), further supporting Hypothesis 2 (and establishing the third step of the mediation analysis).

The first step of the mediation is established in "Mediation Step 1" in Table 2, as the interaction of trust and autonomy has a significant effect on performance ($t_{66} = -2.87$, $p < .01$; $\Delta F_{66,\ 1} = 8.21$, $p < .05$). The test of Hypothesis 2 ("Mediation Step 3 and 4") also establishes the fourth step of the mediation analysis, since the trust by autonomy interaction from the first step is no longer significant when it is included together with the monitoring by autonomy variable. In other words, when the effect of the trust by autonomy interaction on performance is explored without the mediating effect of monitoring, it is significant, but the effect is eliminated when the mediator (the interaction of monitoring by autonomy) is added. Thus, these findings, combined with those described above for Hypotheses 1 and 2, satisfy all four steps of the mediator analysis recommended by Baron and Kenny (1986), and it appears that the expected mediation does occur.

Finally, to explore Hypothesis 2 fully, I plotted the interaction between monitoring and autonomy, as is shown in Figure 3a. The figure shows that when monitoring is lower, the negative relationship between autonomy and performance is stronger than it is when the level of monitoring is higher. The plot also indicates that teams with low levels of monitoring and high levels of autonomy performed worst.

As shown in "Mediation Step 1," trust and autonomy also have a significant interaction when the mediator is not included in the analysis. The interaction, plotted in Figure 3b, shows the expected moderating effect of trust on the relationship between autonomy and performance—mirroring the relationship seen with monitoring and autonomy.

Overall, the results demonstrate strong support for both hypotheses and for the overall expectation that monitoring would mediate the relationship between trust and performance in self-managing teams.

DISCUSSION

Conclusions

The findings have shown that, *under some conditions,* too much trust in a self-managing team can be harmful. This effect is illustrated when the trust-performance relationship is explored in combination with the level of individual autonomy in a

TABLE 2
Moderated Mediation: Results of Hierarchical Multiple Regression Analysis[a]

Steps and Variables	β	F	R^2	ΔR^2	VIF
Mediation step 1: Performance					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.06	6.45**	.28	.28**	1.02
Autonomy	−.52**				1.02
Step 3					
Trust × autonomy	−.29**	7.36**	.36	.08**	1.06
Mediation step 2: Monitoring, Hypothesis 1					
Step 1					
Age	.10	0.62	.02		1.01
GMAT	.10				1.01
Step 2					
Intrateam trust	−.71**	24.06**	.52	.50**	1.01
Step 3					
Intrateam trust squared	−.22*	20.26**	.55	.03*	1.54
Mediation step 3 and 4: Performance, Hypothesis 2					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.01	4.27**	.28	.28**	3.06
Autonomy	−.51**				1.04
Monitoring	.10				2.22
Intrateam trust squared	.05				1.68
Step 3					
Intrateam trust × autonomy	.05	6.14**	.44	.16**	3.32
Monitoring × autonomy	.49*				3.79

[a] Each mediation step contains a hierarchical regression analysis having three steps.
* $p < .05$
** $p < .01$

team. As it turns out, high levels of individual autonomy can become a liability in self-managing teams when the level of trust is high and little monitoring takes place. The mediator analysis demonstrated that the indirect effect of trust appears to be accounted for by the level of monitoring in a team. This pattern suggests that the more team members trust one another, the less they chose to monitor one another, and when this condition is combined with high levels of individual autonomy, performance suffers.

The finding that trust can lead to a performance loss is counterintuitive in that trust has traditionally been regarded as a benefit to teams and organizations. It is important to note that the present finding is an interaction effect: too much trust was harmful only in self-managing teams characterized by high levels of individual autonomy. Generally, the conventional benefits of trust are still expected to hold, and I do not intend to suggest otherwise. The findings are, however, particularly important to the trust literature, because negative effects of high trust on performance have not previously been empirically explored, even though several researchers have suggested that high trust could have a downside (Kramer, 1999; McEvily, Perrone, & Zaheer, 2003).

The practical implication of the findings is not that trust should be avoided in self-managing teams. Rather, the implication is that if a team has high levels of individual autonomy, some monitoring of individual team members needs to be in place if process loss and coordination errors are to be avoided. In self-managing teams, this appears to be particularly important, as high levels of intrateam trust are especially likely to make team members reluctant to monitor one another. The practical implication is essentially that a lack of monitoring can be naïve, regardless of levels of trust, and that a little skepticism never hurt anyone—or any team.

The contribution of these findings extends beyond the counterintuitive conclusion that trust can be harmful in teams, given certain circumstances. These findings also emphasize the importance of exploring moderators in trust research, particularly in team settings (Dirks & Ferrin, 2001), and they define some important boundary conditions for the benefits of trust. In addition, the findings help to link the literature of trust with that of autonomy and self-management in teams, and they expand the scope of current trust research by exploring the effects of the interaction of trust and team characteristics (like autonomy) on team performance.

Limitations and Future Research

A restriction of range may exist in the data, in that levels of trust and autonomy were generally high in most of the studied teams, reducing desired variability. The study essentially explored the difference between moderate and very high levels of trust, as opposed to the difference between low and high levels of trust. However, such a restriction of

FIGURE 2
Relationship Between Trust and Monitoring in Self-Managing Teams

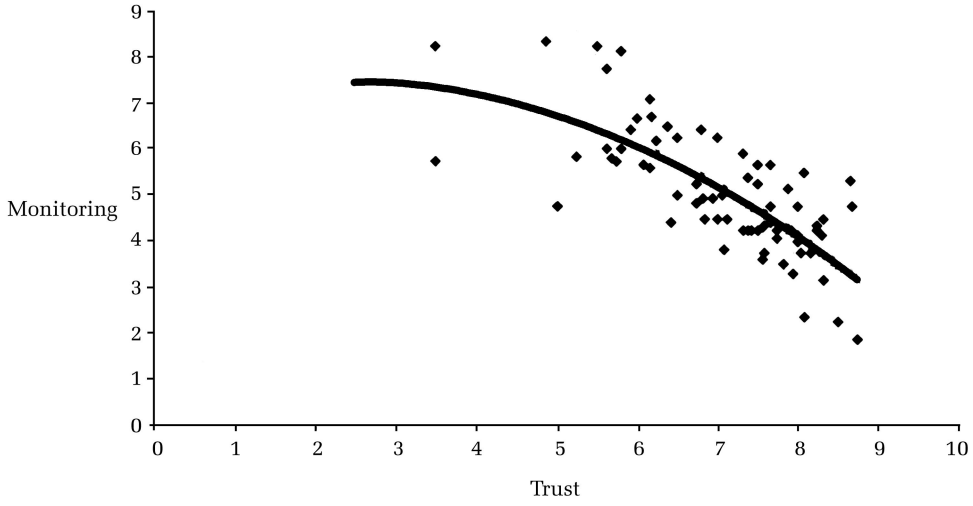
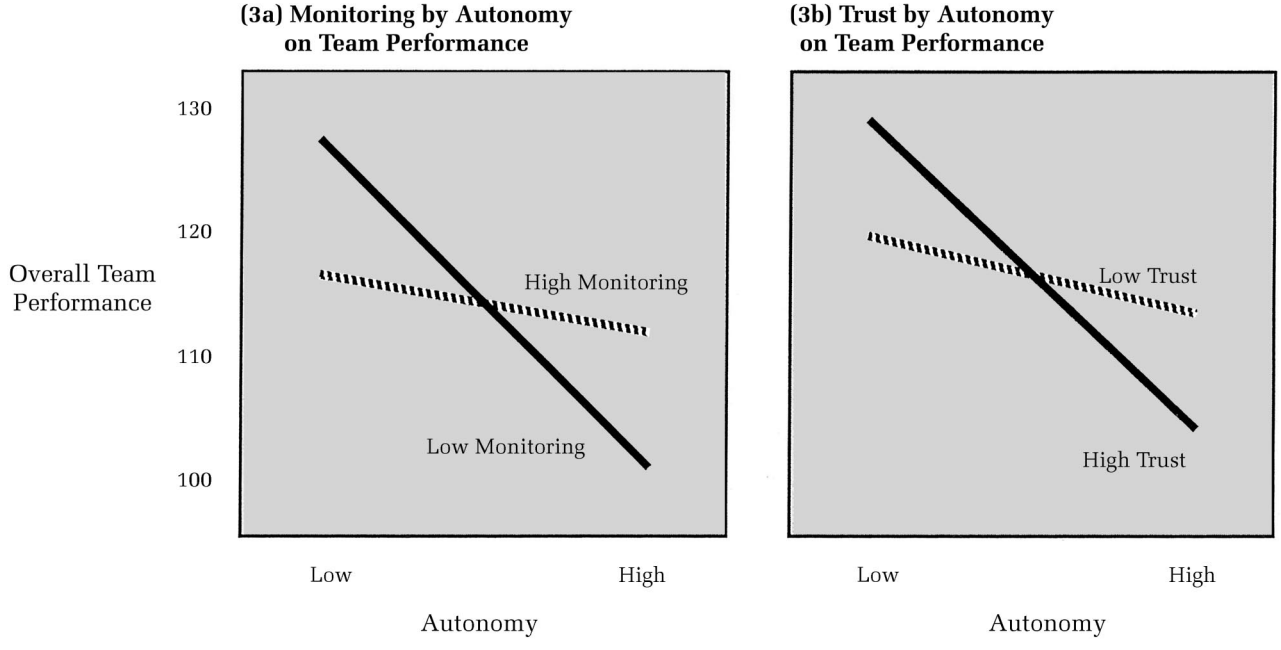


FIGURE 3
Interaction Effects



range would normally create a problem for analysis and causal inference, not for generalizability. The fact that effects were found, including interactions, suggests relative robustness. In terms of generalizability, the composition of the teams may be a limiting factor. Although the teams were quite diverse (in terms of national origin, gender, education, and so forth) they could also be perceived as fairly homogeneous, since all team members were relatively close in age and were MBA students at the same university.

A possible concern surrounding the relationship between trust and monitoring is the direction of causality. The use of cross-sectional data precludes

drawing inferences about causal direction. However, the fact that team members had worked together on a variety of tasks for many months suggests that fairly stable perceptions of trust in other team members were established. Since the task involved in the study was novel and accompanied by severe time pressure (unlike any other task the teams had performed before), it is likely that the teams developed new techniques, roles, and coordination (including new levels of monitoring) for this task.

One exciting avenue for future research is the role of task interdependence, and the question of whether or not it might provide additional boundary conditions for the relationships revealed in this study. The relationship between individual autonomy, monitoring, and performance is in part dependent on coordination, communication, and mutual adjustment within a team; these are also important variables in the considerable literature on task interdependence and its relationship with performance (Saavedra et al., 1993).

Finally, while my focus has been on one particular boundary condition for the benefits of trust in teams, the findings should not be viewed as supporting one counterintuitive aberration, but rather as a general direction for the future. As the organizational research on trust continues to grow, it will be important to balance the study of the benefits of trust with the acknowledgment that those benefits have limits. I have shown that in self-managing teams characterized by high levels of individual autonomy, too much trust can harm team performance. It is likely that there are other conditions under which trust may be harmful, or at least may not have the positive effects normally associated with it. Such examples might be found in the context of cultural differences, negotiation and conflict resolution, team design, or in a variety of other research areas.

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APPENDIX A

Questionnaire Items and Factor Analysis Results

All questions were asked with respect to the specific context of the case competition, with response options ranging from 1, "strongly disagree," to 9, "strongly agree".

Individual Autonomy

1. In the team, I decide how to do my own work.
2. On team projects, I control the scheduling of my work.
3. Once the team decides what to do, I decide how to do my part.

Trust

1. We trust each other a lot in my team.
2. I know I can count on the other team members.
3. The other team members know they can count on me.
4. I trust all of the other team members.

Monitoring

1. We check to make sure that other team members continue to work on team projects.
2. We monitor each others progress on team projects.
3. We check whether everybody is meeting their obligation to the team.
4. We watch to make sure everyone in the team meets their deadlines.

Results of TABLE A1 Factor Analysis[a]

	Loadings		
Scales and Items	**Factor 1**	**Factor 2**	**Factor 3**
Autonomy 1	.01	−.06	**.88**
Autonomy 2	.02	−.07	**.89**
Autonomy 3	.01	.02	**.85**
Trust 1	**.88**	−.06	.01
Trust 2	**.90**	−.07	.01
Trust 3	**.68**	−.19	−.03
Trust 4	**.79**	.13	.13
Monitor 1	−.03	**.77**	.08
Monitor 2	.03	**.85**	.02
Monitor 3	−.07	**.84**	−.07
Monitor 4	−.09	**.75**	−.14

[a] Both a scree plot and an eigenvalue cutoff of 1.0 yielded three factors. Significant loadings are shown in bold.

APPENDIX B

Analysis of Moderated Mediation: Explanation and Alternatives

Conceptualizing Moderated Mediation

The purpose of this appendix is to explain the analyses involved in the moderated mediation analysis of the theoretical model (Figure 1) in the paper. From an analytic viewpoint (that is, constructing regression equations), however, this model is actually no different from the model shown in Figure B1a, since "moderation" represents the interaction between two constructs. While which one moderates which other one is meaningful theoretically, it is irrelevant as far as the analysis (specifically, the multiplicative term in a regression equation) is concerned.

Both models show the same moderated mediation in which the mediator (monitoring) interacts with another variable (autonomy) to cause the outcome variable (performance, which will be referred to as *"y"* in this appendix). It is also worth noting that there are two different types of moderated mediation (James & Brett, 1984; Kenny et al., 1998), each requiring different analyses. In one of these (referred to as type 1 here), the moderation occurs between the initial variable and the mediator, and in the other (here, type 2), the moderation occurs between the mediator and the outcome variable. The analysis of type 2 is more complex, in that only one interaction term is necessary for a type 1 analysis (as is illustrated in Korsgaard, Brodt, and Whitener [2002]), whereas two interactions may be required for a type 2 analysis. My model is clearly a type 2.

To be specific (and just to complicate matters further), this particular model actually represents "curvilinear moderated mediation," since the relationship between the initial variable (trust) and the mediator (monitoring) was expected to be curvilinear. Fortunately, this additional aspect has no effect on the analyses beyond the need to include trust squared in some of the equations. (If the relationship were linear, the squared term would not appear in any of the equations.)

Before discussing the relatively complex case of moderated mediation analysis, it is worth reviewing Baron and Kenny's (1986) procedure for nonmoderated, "simple" mediation analysis, (that is, the case in which monitoring would mediate the effect of trust on y, but no moderator would be involved). For the variables of interest here, Figure B2a illustrates a simple mediation model that is carried out in four steps.

Step 1—Establish the relationship of trust with *y:* $y = f$ *(trust).*

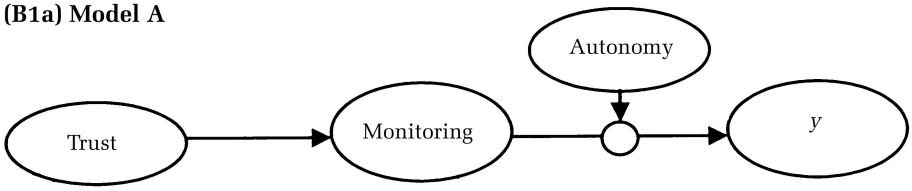
Step 2—Establish the relationship of trust with monitoring: *monitoring* = f *(trust, trust squared)*

Step 3—Establish the relationship of monitoring with *y,* controlling for trust: y = f *(monitoring, trust, trust squared)*

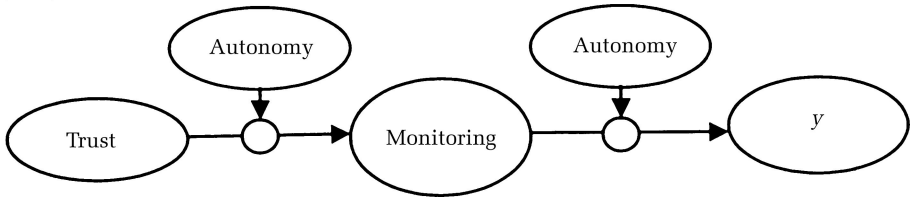
Step 4—Establish that the effect of trust on y is eliminated (showing full mediation) or reduced (partial mediation) when monitoring is in the same

FIGURE B1[a]
Models of Moderated Mediation Analysis

(B1a) Model A



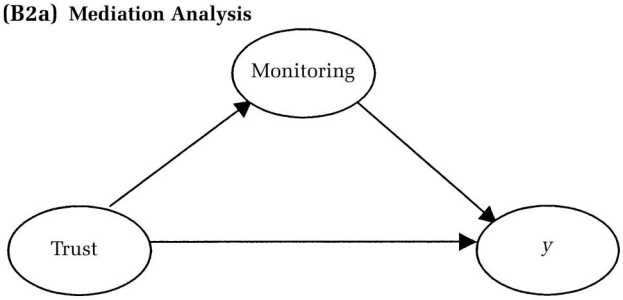
(B1a) Model B



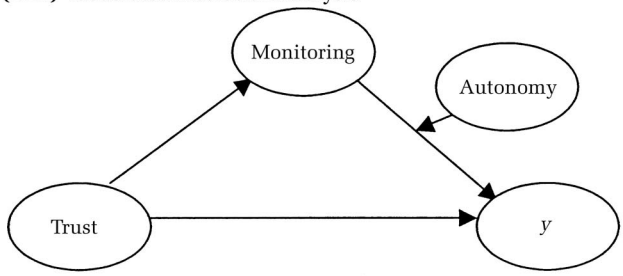
[a]Performance is represented by "*y.*"

FIGURE B2
Models of Moderated Mediation Analysis

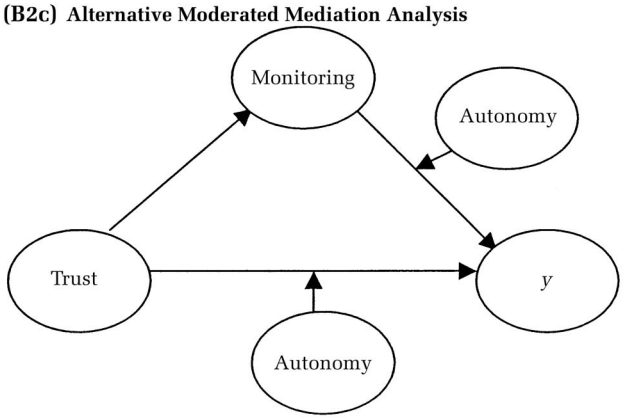
(B2a) Mediation Analysis



(B2b) Moderated Mediation Analysis



(B2c) Alternative Moderated Mediation Analysis



equation. This is accomplished with the step 3 equation.

Moderated mediation, which was hypothesized in this study, is represented in Figure B2b, illustrating the steps of the mediation analysis. Here, the mediator (monitoring) interacts with another variable (autonomy) to cause the outcome variable (y):

Alternative Procedures for Testing Moderated Mediation

Unfortunately, the analytical procedure for this moderated mediation model is not obvious. I have outlined the three most plausible alternatives below, labeling them options 1, 2, and 3. The main difference between option 1 and option 2 is whether or not the trust by autonomy interaction appears only in step 3, or in both steps 1 and 3. Option 3 extends the classic mediation analysis by adding a separate equation to test step 4.

Option 1. This method does not include the interaction term in step 1.

Step 1—Establish the relationship of trust with *y: y = f (trust).*
Step 2—Establish the relationship of trust with monitoring: *monitoring* = f *(trust, trust squared)*
Step 3—Establish the relationship of the interaction of monitoring and autonomy with y, controlling for trust: *y* = f *(trust, trust squared, monitoring, autonomy, monitoring × autonomy)*
Step 4—Establish that the effect of trust on y is eliminated (showing full mediation) or reduced (partial mediation) when monitoring and autonomy are in the same equation. This is accomplished with the step 3 equation.
The results are shown in Table B1.

While this may seem to be the most intuitive or obvious extension of a classic Baron and Kenny (1986) me-

TABLE B1
Results of Moderated Mediation Analysis, Option 1

Steps and Variables	β	F	R^2	ΔR^2	VIF
Mediation step 1: Performance					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.06	6.45**	.28	.28**	1.02
Autonomy	−.52**				1.02
Mediation step 2: Monitoring					
Step 1					
Age	.10	0.62	.02		1.01
GMAT	.10				1.01
Step 2					
Intrateam trust	−.71	24.06**	.52	.50**	1.01
Step 3					
Intrateam trust squared	−.22	20.26**	.55	.03*	1.54
Mediation step 3 and 4: Performance					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.01	4.27**	.28	.28**	3.06
Autonomy	−.51**				1.04
Monitoring	.10				2.22
Intrateam trust squared	.05				1.68
Step 3					
Monitoring × autonomy	.44**	7.11**	.44	.16**	1.28

diator analysis, step 1 is problematic. Specifically, if mediation takes place, and especially if the interaction between monitoring and autonomy is disordinal (which it turned out to be in this case), then there is no reason to expect a direct (nonmoderated) link between trust and *y* in step 1. If the effect of trust on *y* is carried through the mediator, then it is also carried through that mediator's interaction—and one wouldn't expect a detectable direct effect of trust on *y*. Thus, if partial or full mediation were present, it would be unreasonable to expect step 1 of this mediation analysis to be satisfied.

Recently it has been suggested that step 1 of the classic mediation analysis is not actually necessary to establish mediation (Collins, Graham, & Flaherty, 1998; MacKinnon, 2000; Shrout & Bolger, 2002). The logic is that step 1 is not required, since a path from the initial variable to the outcome is implied if steps 2 and 3 are met. The emphasis is on steps 2 and 3 over step 1, since there are a variety of ways in which mediation could be occurring, but the direct relationship in step 1 still would not be significant—including causal distance, suppressor variables, and (as is the case in this particular model), contingencies operating on the mediator itself. This view suggests that option 1 may in fact be a viable method for type 2 moderated mediation analysis, with the caveat that step 1 does not have to be significant. A slight variation on option 1 would be to include the autonomy term in step 1, consistent with the implied logic of James and Brett (1984), as well as the empirical analysis by Langfred (2000).

Option 2. This method acknowledges the problem with option 1 noted above and includes the interaction of trust and autonomy in step 1. This method relies on the assumption that the step 1 relationship has to be moderated if the mediator's relationship with the outcome variable is itself moderated, as illustrated in Figure B2c.

The regression analysis takes the following form:

Step 1—Establish the relationship of the interaction of trust and autonomy with *y: y* = f *(trust, autonomy, trust* × *autonomy).* This the relationship that trust has with y in the absence of monitoring.

Step 2—Establish the relationship of trust with monitoring: *monitoring* = f *(trust, trust squared)*

Step 3—Establish the relationship of the interaction of monitoring and autonomy with *y,* controlling for the interaction of trust and autonomy: *y = (trust, trust squared, autonomy, monitoring, trust* × *autonomy, monitoring* × *autonomy)*

Step 4—Establish that the effect of the interaction of trust and autonomy on *y* is eliminated (full mediation) or reduced (partial mediation) when monitoring is in the same equation. This is accomplished with the step 3 equation.

The steps just outlined compose the method used in the study, and the results are shown in Table 2. Hull, Tedlie, and Lehn's (1992) discussion of controlling for moderators implies support for this method. Empirically, Brockner, Chen, Manniz, Leung, and Skarlicki (2000) included both interaction terms in their analysis, as did Sheeran and Abraham (2003).

This method raises a different question, however. Logically, this set of regression equations seems to imply that the interaction between monitoring and autonomy mediates the effect of the interaction of trust and autonomy on *y,* which is not precisely what my theoretical model indicates. Rather, my model suggests that trust and autonomy interact, in the absence of other variables, to affect *y*. When monitoring is introduced into the picture, it turns out that it is monitoring that interacts with autonomy, and it only appeared to be trust because trust is highly correlated with monitoring. That is a qualitatively different theory than the suggestion that the interactive effect of trust and autonomy on *y* is mediated (or carried) by the interactive effect of monitoring and autonomy on *y*. My theory posits the type 2 moderated mediation shown as "Model A" in Figure B1a above. The analysis in

option 2, however, seems to test the "Model B" shown in Figure B1b, which includes *both* type 1 and type 2 moderated mediation:

That interpretation is supported by the work of James and Brett (1984), who tested exactly such a model (Model B) with the regression methodology laid out in option 2. This suggests that the set of regression equations in option 2 might not be entirely appropriate for model A, as it tests a different and slightly more complex model. It is worth noting that Brockner et al. suggested that the monitoring by autonomy interaction does not have to be significant when it is in the same equation as the trust by autonomy interaction to show mediation, just that the reduction or elimination of the trust by autonomy interaction has to occur. In fact, Brockner et al.'s analysis is consistent with the final option discussed below, which is a variation (or extension) of option 2.

Option 3. This method includes the interaction term in step 1 but separates steps 3 and 4 into separate regression equations, in a departure from Baron and Kenny's (1986) approach.

Step 1—Establish the relationship of the interaction of trust and autonomy with *y: y* = f *(trust, autonomy, trust* × *autonomy);* that is the relationship that trust has with *y* in the absence of monitoring.

Step 2—Establish the relationship of trust with monitoring: *monitoring* = f *(trust, trust squared).*

Step 3—Establish the relationship of the interaction of monitoring and autonomy with *y,* controlling for trust, but not controlling for the interaction between trust and autonomy: *y = (trust, trust squared, autonomy, monitoring, monitoring* × *autonomy)*

Step 4—Establish that the effect of the interaction of trust and autonomy on *y* is eliminated (full mediation) or reduced (partial mediation) when monitoring is in the same equation. This is accomplished with a *different* equation than the step 3 equation, namely the equation with both interactive terms: *y = (trust, trust squared, autonomy, monitoring, trust* × *autonomy, monitoring* × *autonomy).* However, this equation is used *only* to test the reduction or elimination of the trust × autonomy term, not to test for the effect of the monitoring × autonomy term on *y.*

The results of this method are shown in Table B2.

This may be the most appropriate method with which to analyze type 2 moderated mediation, but it differs from the traditional Baron and Kenny (1986) methodology by adding a fourth equation for step 4. Option 3 includes the trust by autonomy interaction in step 1 like option 2—on the basis of the same logic that the direct relationship is meaningless—but uses two different equations for steps 3 and 4. Step 3 tests the effect of the monitoring by autonomy interaction on *y,* controlling for the relationship between trust and monitoring, which is not moderated, and therefore the trust by autonomy term does not appear in this equation. If significant, this establishes the mediation. A fourth step is then needed to

TABLE B2
Results of Moderated Mediation Analysis Option 3

Steps and Variables	β	F	R^2	ΔR^2	VIF
Mediation step 1: Performance					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.06	6.45**	.28	.28**	1.02
Autonomy	−.52**				1.02
Step 3					
Intrateam trust × autonomy	−.29**	7.36**	.36	.08**	1.06
Mediation step 2: Monitoring					
Step 1					
Age	.10	0.62	.02		1.01
GMAT	.10				1.01
Step 2					
Intrateam trust	−.71	24.06**	.52	.50**	1.01
Step 3					
Intrateam trust squared	−.22	20.26**	.55	.03*	1.54
Mediation Step 3: Performance					
Step 1					
Age	.02	0.08	.00		1.01
GMAT	.05				1.01
Step 2					
Intrateam trust	−.01	4.27**	.28	.28**	3.06
Autonomy	−.51**				1.04
Monitoring	.10				2.22
Intrateam trust squared	.05				1.68
Step 3					
Monitoring × autonomy	.44**	7.11**	.44	.16**	1.28
Mediation Step 4: Performance					
Step 1					
Age	.02	0.08	.00		1.02
GMAT	.05				1.02
Step 2					
Intrateam trust	−.01	4.27**	.28	.28**	3.06
Autonomy	−.51**				1.04
Monitoring	.10				2.22
Intrateam trust squared	.05				1.68
Step 3					
Intrateam trust × autonomy	.05	6.14**	.44	.16**	3.32
Monitoring × autonomy	.49*				3.79

explore to what extent the monitoring by autonomy effect on *y* reduces or eliminates the original effect of the trust by autonomy interaction on *y*. In step 4, therefore, both interactions are included, and the interest is in the change in significance (if any) between the trust by autonomy term in step 1 and in this step, to determine whether or not the mediation is partial or full. Thus, in step 4, the significance of the monitoring by autonomy term itself is unimportant.

Conclusion

There is no clear consensus on which of the methods above is the correct one. There are proponents of option 1, but not all agree that step 1 is unnecessary for testing mediation, and there is some disagreement as to how many variables to enter in step 1. There is also support for option 2, but it seems unlikely that the same methodology would be correct to test both the model A and model B illustrated above. Thus, it is not clear that option 2 is the most correct methodology for type 2 moderated mediation. Option 3 provides most information by using four equations and including all steps from both option 1 and 2. Option 3 has support in the empirical literature, just as options 1 and 2 do, but it does depart from the traditional Baron and Kenny (1986) format by introducing a fourth equation.

As can be seen from the regression results in Tables 2, B1, and B2, results for each of the three options supported the model. In the article, I chose to report the option 2 results, as that method is the most conservative in that it includes both interactions in step 3 and requires the significance of the monitoring by autonomy interaction term as well as the nonsignificance of the trust by autonomy term. For future use, I recommend option 3, since it includes all of the information of option 2, but provides information beyond that with the additional step in the analysis. As such, nothing from option 2 is lost by using option 3, and it may provide the most prudent and comprehensive method for the future analysis of this type of moderated mediation.

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