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Time pressure, potency, and progress in project groups

Josette M.P. Gevers, Wendelien van Eerde, and Christel G. Rutte

Eindhoven University of Technology, The Netherlands

Many project groups have a hard time meeting their deadlines. This research addresses this issue by studying group perceptions and group self-regulatory actions that may impede or foster the timeliness of group projects. Longitudinal data were collected from 22 student project groups developing a business solution in a field assignment. Using a questionnaire, we measured perceived time pressure, group potency, planning, and reflexivity, as well as the project's progress at three points during the 13-week working period: at the start of the project, just after the orientation phase, and finally after the execution phase and the project deadline.

Our findings suggest that the effect of time pressure on progress is moderated by group potency. Furthermore, there were differential effects of planning and reflexivity in the orientation phase and the execution phase. Execution planning and reflexivity did not appear to be very useful for progress in the orientation phase of the project. However, in the execution phase, both planning and reflexivity contributed to meeting the deadline.

Meeting deadlines is a problematic issue for many project groups. In a survey conducted by Tukel and Rom (1998), 91 managers of project teams were questioned, and 56% indicated that deadlines were often exceeded or missed. Nevertheless, little empirical research has been conducted on time-related aspects of project group performance. Therefore, additional insights into what factors would facilitate timely project completion could be valuable to theory as well as practice.

This article describes a longitudinal study on the influence of perceived time pressure, group potency, and group self-regulatory actions such as planning and reflection on progress in project groups. Considering the dynamic nature of the project life cycle, we expect these relations to be contingent upon project stages

Requests for reprints should be addressed to J.M.P. Gevers, Eindhoven University of Technology, Faculty of Technology Management, P.O. Box 513, 5600 MB Eindhoven, The Netherlands. Email: j.m.p.gevers@tm.tue.nl

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(cf. Pinto & Prescott, 1988). In other words, the extent to which time pressure, group potency, planning, and reflexivity contribute to timely completion of the group project may depend on the project stage in which they take place.

In our research, we distinguish two project stages, based on the project life cycle model suggested by Adams and Barndt (1983) and King and Cleland (1983). Although the original model distinguishes four phases, we omit the first and the last phase, which are mainly concerned with acquisition and project initiation, and with client consultancy after project determination. Because our study involves student groups that carry out assigned projects without being involved in acquisition or implementation, we use a simplified version with only two phases. The orientation phase comprises the translation of preliminary goals into a more formalized set of plans and performance strategies. In the second phase (the execution phase), the actual work of the project is performed; materials and resources are procured and transformed into the intended project result.

TIME PRESSURE AND GROUP POTENCY

A deadline is an important "time-marker" (McGrath & O'Connor, 1996) that puts a task within a certain time frame and motivates groups to start working on the task. The motivational power intensifies as the deadline approaches and the level of time pressure rises. Time pressure arises when the available time is perceived to be insufficient and the violation of the time limit is known to lead to sanctions (Rastegary & Landy, 1993).

Several studies have demonstrated that groups increase their activity on a task when they begin to feel time pressure because of an approaching deadline (Gersick, 1988, 1989; Gladstein, 1984; Seers & Woodruff, 1997). Thus, there appears to be a subtle relationship between the awareness that time is running out and making progress. This does not mean that intensifying time limits in order to promote productivity and efficiency will always be effective. In most tasks, the relationship between time pressure and performance is curvilinear: Optimal performance is achieved under an intermediate level of time pressure (Rastegary & Landy, 1993). Too little time pressure leads to boredom, so that attention is drawn to activities outside the project. Very high levels of time pressure produce stress, causing so much arousal that avoidance reactions may occur (Carver, 1996), resulting in procrastination (Van Eerde, 2000).

Perception plays a central role in the experience of time pressure. Whether a group will perceive the time available for performing a task as sufficient will in part depend on the confidence the group has in its abilities. Guzzo, Yost, Campbell, and Shea (1993) call this "group potency"—the collective belief within a group that it can be effective. We argue that groups that lack confidence in their abilities will experience more time pressure. What is more, they will not

experience time pressure as stimulating, but rather as a threat. To find a temporary relief from this stressor, these groups might be inclined to procrastinate. Van Eerde (2000) identifies procrastination as the avoidance of the implementation of an intention because a task is perceived as unattractive or threatening. Research on individual projects by Blunt and Pychyl (2000) indicates that procrastination is particularly likely to take place in the orientation phase of a project. Therefore, we expect groups with low potency to procrastinate in the orientation phase to avoid the project tasks.

Thus, depending upon the strength of a group's belief in their potential for effectiveness, time pressure can either motivate or discourage group activity in the orientation phase of the project. Groups with high potency that experience time pressure will start working right away to make sure they make good progress, whereas groups with low potency that experience time pressure will tend to procrastinate and, as a result, make less progress. Hence, we expect that the effect of time pressure on project progress will be moderated by group potency. For the orientation phase of the project, we propose the following.

In the orientation phase, high time pressure will have a positive effect on project progress for groups with high potency, and a negative effect on project progress for groups with low potency (H1).

Groups with low potency are likely to procrastinate to avoid an unpleasant or threatening task. This, however, does not imply that groups with high potency do not procrastinate in the orientation phase. After all, they may give priority to more urgent or pleasurable tasks outside of the project. In general, the rule will apply that whenever groups procrastinate in the orientation phase, the progress resulting from that stage will be limited. As a consequence, the time pressure in the execution phase will rise, because some of the work that could have been done in the orientation phase has been put off till later. We expect that high potency groups will be motivated by the backlog and the growing time pressure to make up for the lost time. For low potency groups, however, a backlog will make their task even more unfeasible. Even though, at this stage, they may be motivated to work hard, we presume they lack the capability to work effectively under high time pressure, so their performance will be adversely affected once again.

Thus, the effect of making little progress in the orientation phase on the project progress in the execution phase will be moderated by group potency. For the execution phase of the project, we propose the following.

Making little progress in the orientation phase will have a positive effect on project progress in the execution phase for groups with high potency, and a negative effect for groups with low potency (H2).

GROUP SELF-REGULATION: PLANNING AND REFLEXIVITY

At the individual level, self-regulation is defined as the ways in which people control and direct their own actions in the service of some goal or goals (Fiske & Taylor, 1991). Self-regulation implies the modulation of thought, affect, behaviour, or attention by use of specific mechanisms and supportive metaskills, to guide goal-directed activities (Karoly, 1993). These processes are internal as well as transactional. Groups can also use such metaskills and mechanisms to regulate their goal-directed behaviour over time and across changing circumstances. In this article, we pay special attention to two self-regulation mechanisms that groups may use to organize, coordinate, evaluate and adapt their activities: planning and reflexivity.

Planning

Planning refers to a self-regulation mechanism by which groups make a plan of action for goal attainment. In anchored planning, or execution planning, the project is decomposed into subgoals for which specific tasks are determined and time schedules are made (Tripoli, 1998). Based on that, the group decides who will do what, when, and in what order.

Research by Sonnentag (1998) and Tripoli (1998) has shown that detailed execution planning does not improve individual performance. However, coordination requirements will be higher when tasks are performed in groups, due to interdependent working. Hence, execution planning may be an important tool for successfully coordinating group members' efforts in group projects (Weingart, 1992).

Weingart (1992) distinguished between pre-planning and in-process planning. Whereas pre-planning takes place before group members start executing their task, in-process planning occurs during task performance. This means that only the first few actions are planned in the orientation phase of the project, and subsequent more detailed planning is developed in the execution phase, based on feedback derived from actions undertaken (Schippers, Den Hartog, & Koopman, 1999). According to Tripoli (1998), detailed execution planning is useful only when objectives are clear and circumstances are predictable. When groups know which action steps should be taken, and the outcomes of activities are largely predictable, execution planning will contribute to timely task completion. This leads us to posit the following hypothesis.

Whereas execution planning will not affect project progress in the orientation phase, it will have a positive effect on project progress in the execution phase (H3).

Reflexivity

Using feedback to monitor group performance is an essential part of group self-regulation (Carver & Schreier, 1990). By comparing the actual project progress with the project plan a group receives feedback. This information provides clues to where plans and actions require adjustments. West (1996) denotes a group's communication on this type of self-regulation with the term group reflexivity. He defines reflexivity as "the extent to which group members collectively reflect upon the group's objectives, task strategies, and internal processes, and adapt them to current or anticipated endogenous or environmental circumstances" (West, 1996, p. 559). According to West, reflexive teams will be more adaptive in the execution of their tasks and will therefore be more effective, especially when operating in uncertain and dynamic circumstances. Our last hypothesis therefore reads as follows.

High group reflexivity will contribute to project progress both in the orientation phase and the execution phase of the project (H4).

METHOD

Participants

Participants were 93 students at Eindhoven University of Technology working in 22 project groups of three to six people developing a business solution in a field assignment. The project groups were "leaderless groups" in that all group members had equal positions. Most group members were already acquainted from earlier group projects. All projects had two milestones: after three weeks the groups had to present a project plan; and after 13 weeks the project had to be completed, resulting in a final report. Students were asked to fill out a questionnaire on teamwork and team performance at three times during the 13-week working period. Participation was voluntary and participants were guaranteed confidentiality. In addition, the students were assured that participation would not influence their grade for the assignment in any way. Four participants, chosen randomly, received a reward of 50 guilders. In total, 93.5% of the students filled out the questionnaire at least once, 67% of the participants completed all three questionnaires. All groups were represented at each data collection point.

Procedure

Longitudinal data were collected by administering the same questionnaire at three data points. Time 1 was at the start of the project, just after the students were assigned to a particular project. Time 2 was after 3 weeks, at the first

milestone when the project plans were presented. Time 3 was after 13 weeks, immediately after the project deadline. Time 1 represents the baseline; Time 2 represents the orientation phase; and Time 3 represents the execution phase. Participants were requested to complete the questionnaire (using either a paper version or an electronic version on the Internet) without consulting their fellow group members.

Variables

The items in the questionnaire were formulated at the group level and referred to the project phase preceding the specific data collection point, except at Time 1 when the items were related to the students' expectations for the whole of the group project. Respondents were asked to indicate to what extent a particular group characteristic, task characteristic, or work approach was applicable to his or her group. Response formats ranged from 1 to 5, unless indicated differently below. For all constructs measured, a higher score indicates a higher applicability to the group and its functioning. Cronbach's alphas, indicating the internal consistency of the scales, are presented in Table 1.

Time pressure. Time pressure was measured at Time 1 using four items of the subscale "perceived workload" of the "Vragenlijst Beleving en Beoordeling Arbeid", a Dutch instrument for measuring psychosocial workload and stress (Van Veldhoven, Meijman, Broersen, & Fortuin, 1997). Respondents were asked to what extent they thought the group would experience time pressure in this project. Because the original scale referred to the individual level the formulations of the items were adapted to the group level. An example of the items is: "To what extent do you expect your group will have to do too much work in the time available".

Group potency. Group potency was measured at Time 1, Time 2, and Time 3. Considering the total length of the questionnaire, we selected five items that were relevant to this sample, from an 8-item scale for group potency by Guzzo et al. (1993). Examples of the items are: "This team has confidence in itself" and "This team believes it can become unusually good at producing high-quality work". Because the variable distributions diverged from the normal distribution at Time 2 and Time 3 (skewness: –1.33 and –.91, respectively; kurtosis: 3.02 and 1.84, respectively), distributions were corrected using log linear transformation (Tabachnick & Fidell, 1996). As a result, scores now ranged from 0 to 1, with higher scores indicating higher group potency.

Planning. Seven items were used to measure execution planning as the formulation of specific goals, tasks, and time frames for project execution. The measure is largely based on Tripoli's (1998) scale for *anchored planning.*

TABLE 1
Means, standard deviations, distributions, and intercorrelations of the variables ($N = 22$)

	M	*SD*	*S*	*K*	$\overline{R}_{wg(j)}$	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Time 1														
1. Time pressure	3.48	0.33	–.41	–.30	.92	**.66**								
2. Group potency	3.51	0.31	.40	–.18	.95	.11	**.75**							
Time 2														
3. Group potency	0.81	0.11	–.41	.79	.94	.09	.56**	**.82**						
4. Planning	3.32	0.36	–.39	–.52	.94	–.34	.01	.29	**.76**					
5. Reflexivity	2.83	0.32	.54	–.40	.85	–.17	.39	.43*	.27	**.82**				
6. Progress	40.83	9.36	.09	–.60	.93	–.14	–.28	–.01	–.06	–.15	—			
Time 3														
7. Group potency	0.78	0.10	–.03	.72	.95	–.10	.28	.58**	.25	.02	.26	**.81**		
8. Planning	0.80	0.11	–.21	.65	.94	–.11	.41	.35	.37	.19	.37	.68***	**.75**	
9. Reflexivity	2.76	0.47	–.60	.69	.90	–.12	.43*	.28	–.02	.43*	–.17	.37	.52**	**.78**
10. Progress	3.48	1.29	–.33	–.54	.98	–.26	.15	.06	.15	–.22	.09	.53**	.52**	.48*

Internal consistencies of the scales (α), as measured at the individual level, are presented in bold printing on the diagonal. *M* = means; *SD* = Standard deviation; *S* = skewness; *K* = kurtosis; $\overline{R}_{wg(j)}$ = mean interrater reliability.

*$p < .05$; **$p < .01$; ***$p < .001$.

Because that scale referred to the individual level the formulations of the items were adapted to the group level. Furthermore, three additional items were formulated to measure prioritization and task allocation. Examples of the items used are: "To what extent did your group lay out subgoals to accomplish along the way?" and "To what extent did your group plan who should do what?". Planning was measured at Time 2 and Time 3. At Time 3, the variable distribution diverged from normality (skewness = –1.20; kurtosis = 3.04), which was corrected by means of a log linear transformation (Tabachnick & Fidell, 1996). Scores on this variable now range from 0.52 to 1.00, with higher scores indicating more planning.

Reflexivity. Reflexivity was measured at Time 2 and Time 3 using the Dutch translation (Schippers et al., 1999) of the reflexivity scale described by Swift and West (1998). Although the scale originally consisted of eight items, we omitted one of these items in our questionnaire because of an ambiguity in its formulation. Examples of the items we did use are: "To what extent did your project group discuss whether you were working effectively together?" and "To what extent did your project group discuss how well information is communicated by the group?"

Project progress. Project progress was measured at Time 2 and Time 3 using 10 subtasks formulated in the project assignment. Examples of subtasks are "problem definition", "plan for quick scan", "in-depth analysis" and "final report" (see Appendix for all items). Respondents were asked to indicate the extent to which each of the subtasks was completed, on a scale from 0% to 100%. Each subtask accounted for 10% of the total work package, and the project was therefore fully completed when all 10 subtasks were 100% accomplished. At Time 3, the variable distribution was skewed (skewness = –1.44; kurtosis = 3.48), which was corrected by means of a square root transformation, following the guidelines of Tabachnick and Fidell (1996). Whereas the original scale ranged from zero up to 100, the scale after transformation ranged from 0 to 5, with higher scores indicating a higher level of project completion.

Data-analysis

The data were analysed at the group level, testing hypotheses at a one-tailed significance level of .05 (alpha). For each variable, individual scores were aggregated to group mean scores based on high levels of intra-group agreement (see Table 1, $\overline{R}_{wg(j)}$; James, Demarée, & Wolf, 1984). Due to the limited number of groups included in the study, Hypotheses 1 and 2 could not be tested in one model, so we performed one hierarchical multiple regression analysis for each hypothesis separately. Moderators were tested following the guidelines of Baron and Kenny (1986). All analyses were performed before as well as after the data

transformations. As this did not reveal any substantial differences, only the results of the analysis on the transformated data are presented in the following section.

RESULTS

Table 1 presents the alphas, distributions, and intercorrelations of all variables in the study. The fact that the intercorrelations are generally low suggests that the variables represent different constructs. In consideration of the high correlation between reflexivity and planning at Time 3, we tested the discriminative validity in a confirmatory factor analysis using LISREL 8.30 (Jöreskog & Sörbom, 1996). By means of a Chi-square difference test, we tested whether a one-factor model fitted the data better than a two-factor model (Bollen, 1989). The results of the test indicated that the two-factor is a significantly better fit than the one-factor model ($\Delta\ \chi^2 = 64.67$; $df = 1$; $p = .000$),[1] thereby confirming the conceptual difference between planning and reflexivity.

Hypothesis 1 predicts that group potency is a moderator for the effect of time pressure on the progress groups make in the orientation phase of the project. Table 2 presents the results of the hierarchical multiple regression analysis we performed to test the hypothesis. Step 1 of the analysis shows no direct effects of time pressure on project progress in the orientation phase. Step 2 reveals a significant interaction effect indicating that the effect of time pressure on project progress is indeed moderated by group potency ($\beta = .48$; $\Delta R^2 = .18$; $p < .01$). The interaction effect is depicted in Figure 1.[2]

Figure 1 shows that the progress made by groups with high levels of potency is hardly affected by the amount of time pressure anticipated by these groups. Low potency groups, however, make far more progress when they expect the level of time pressure in the project to be low than when they anticipate having to work under high levels of time pressure. Thus, our first hypothesis is only partially confirmed. In the orientation phase, high time pressure does not have the hypothesized positive effect on project progress for high potency groups, but it does have the expected detrimental effect on the progress made by low potency groups.

Hypothesis 2 assumes that, depending on a group's sense of potency, making little progress in the orientation phase can have either a positive or a negative effect on a group's progress in the execution phase. The lack of progress will motivate high potency groups to catch up and make sure the work is finished on

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[1]The fit indices for both factor models are as follows. Fit indices for the one factor model: $\chi^2 = 146.57$, $df = 76$, $p = .000$, RMSEA = 0.11, AIC = 204.67, CFI = 0.74. Fit indices for the two factor model: $\chi^2 = 81.90$, $df = 75$, $p = .27$, RMSEA = 0.04, AIC = 141.90, CFI = 0.93.

[2]Figure 1 and Figure 2 depict the regression lines between one standard deviation below and above the means of the independent variables.

TABLE 2
Hierarchical multiple regression analysis for the effects of time pressure, group potency, and their interaction term on project progress in the orientation phase ($N = 22$)

Variable	*B*	*SE B*	β	R^2	*adj.*R^2	ΔR^2
Step 1						
Intercept	40.83	2.00				
Time pressure T1	–1.01	2.06	–.11			
Group potency T1	–2.49	2.06	–.27	.09	–.01	.09
Step 2						
Intercept	40.36	1.85				
Time pressure T1	–2.51	2.02	–.27			
Group potency T1	–3.66	1.97	–.39*			
Time pressure T1 × group potency T1	4.51	2.12	.48**	.27	.15	.18**

Time pressure and group potency have been standardized to avoid multicollinearity.
*$p < .05$, one-tailed; **$p < .01$, one-tailed.

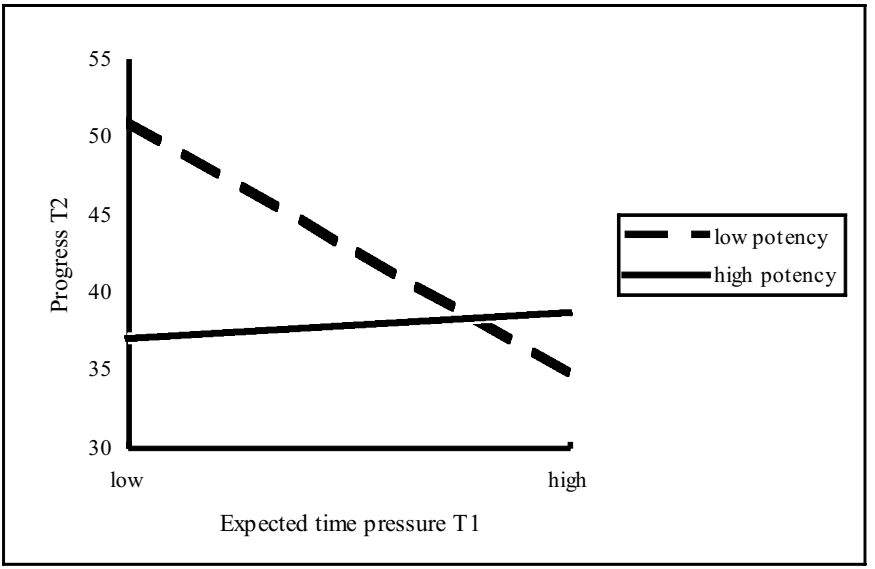

Figure 1. The effect of time pressure on progress in the orientation phase for low potency groups and high potency groups.

time. For low potency groups the backlog will make the task seem even more difficult, affecting performance in a negative way. This hypothesis was tested in a second hierarchical multiple regression analysis. The results are reported in Table 3.

As predicted, the effect of progress in the orientation phase on progress in the execution phase is indeed moderated by group potency ($\beta = -.71$; $\Delta R^2 = .38$; $p < .001$). The interaction effect is depicted in Figure 2. The figure shows that, for high potency groups, the smaller the progress in the orientation phase, the more work is actually finished at the deadline. For low potency groups the effect is reversed: the percentage of work finished at the deadline is higher as more progress is made in the orientation phase. Herewith, our second hypothesis is confirmed. While making a limited amount of progress in the orientation phase enhances the performance of high potency groups, it negatively affects the performance of low potency groups.

Hypothesis 3 addresses the effect of planning on performance in project groups. We assumed that detailed execution planning would not affect progress in the orientation phase, while it would enhance progress in the execution phase. This hypothesis was examined using the correlations from Table 1. At Time 2, representing the orientation phase, planning is not associated with progress ($r = -.06$, n.s.). At Time 3, the execution phase, there is a positive relationship between planning and progress ($r = .52$, $p < .01$). Our hypothesis that making an execution planning will positively affect progress in the execution phase is thus confirmed.

TABLE 3
Hierarchical multiple regression analysis for the effect of progress and group potency at Time 2, and their interaction term, on project progress at Time 3 ($N = 22$)

Variable	*B*	*SE B*	β	R^2	*adj.*R^2	ΔR^2
Step 1						
Intercept	3.48	.28				
Progress T2	–.12	.29	–.09			
Group potency T2	.08	.29	.06	.01	–.09	.01
Step 2						
Intercept	3.46	.23				
Progress T2	–.55	.27	–.42*			
Group potency T2	.24	.24	.19			
Progress T2 × Group potency T2	–1.38	.41	–.71***	.39	.29	.38***

Progress T2 and group potency T2 have been standardized to avoid multicollinearity.
*$p < .05$, one-tailed; ***$p < .001$, one-tailed.

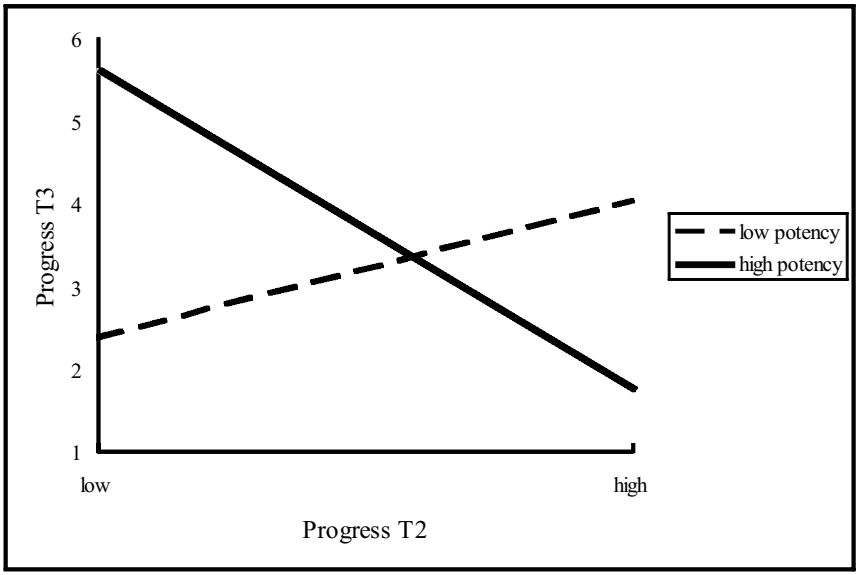

Figure 2. The effect of progress in the orientation phase on the progress in the execution phase for low potency groups and high potency groups.

According to Hypothesis 4, reflexivity will contribute to project progress in the orientation phase as well as the execution phase. In contrast to our expectations, reflexivity does not affect progress in the orientation phase ($r = -.15$, n.s.). In the execution phase, however, we do find the expected positive relationship between reflexivity and progress ($r = .48$, $p < .05$). Our last hypothesis, therefore, is only partially confirmed.

DISCUSSION

The objective of this study was to examine the effects of group perceptions and group self-regulatory actions on progress in project groups. We expected these effects to be contingent upon project stages. Therefore, we studied the effects of time pressure, group potency, planning, and reflexivity on progress in the orientation phase and the execution phase of the group project. As anticipated, our findings suggest that progress in project groups does not result from simple direct relationships, but originates from a combination of factors influencing group performance. In addition, the study provides evidence for the presumed differential effects for the two project phases.

First, the study shows the importance of group potency in shaping the influence of time pressure on project progress. As predicted, high time pressure

hinders effective and timely performance of low potency groups. In the orientation phase, these groups do not make as much progress if they perceive the task to be associated with high levels of time pressure. In the execution phase, their progress is again negatively affected by the backlog from the orientation phase. In contrast with our expectation, high time pressure does not enhance performance for high potency groups in the orientation phase. However, for these groups, a backlog from the orientation phase has a positive effect on their performance in the execution phase.

Evidently, high and low potency groups react differently to high levels of time pressure. Whereas the performance of low potency groups is negatively affected by high levels of time pressure from the orientation phase onward, high potency groups remain unconcerned with it until the execution phase. We explain these effects in presuming that, in the orientation phase, low potency groups are discouraged by high levels of time pressure, which probably leads them to procrastinate, resulting in limited progress. At this stage, high potency groups seem unconcerned with the time pressure, making equal amounts of progress under low and high levels of perceived time pressure. We argued that both low and high potency group may procrastinate in the orientation phase—be it for different reasons—which results in a backlog and leads to higher levels of time pressure in the execution phase. As expected, we find different reactions to such a backlog and rising time pressure in the execution phase for low and high potency groups. At this stage, high potency groups are challenged by the rising time pressure, and they manage to make up the arrears. Apparently, they have the capability to give priority to other activities and still make sure that the project is completed on time. This strategy does not work for low potency groups. For them, the backlog makes their task so difficult that they fail to meet the project deadline, presumably because they lack the capability to work quickly under high time pressure.

Second, our findings also indicate that group self-regulatory actions contribute to project progress. However, this effect applies primarily to the execution phase. As predicted, execution planning is beneficial to group performance in the execution phase, but not in the orientation phase. This is in accordance with Weingart's (1992) and Tripoli's (1998) perspective that detailed planning of task execution is useful for coordinating group activities only after clarity about goals and circumstances is established. Nevertheless, other types of planning, such as planning goals, prioritizing, and contingency planning, may still be of importance to group performance in the orientation phase of a project.

Finally, as with planning, our findings also demonstrate a positive effect of reflexivity on project progress. As expected, the collective reflection upon group activities, working processes and project progress, and the adequate adaptation of these strategies and processes, contributes to timely performance in the execution phase. We were, however, unable to confirm our assumption that reflexivity

would also be beneficial to group performance in the orientation phase. Looking at the overall level of reflexivity at the orientation phase (Table 1, $M = 2.83$, $SD = 0.32$), we think that all groups tend to be highly reflexive at this stage of the project. This may well result from the specific nature and purpose of the orientation phase. Nevertheless, we may conclude that it is the continuation of reflexivity in the execution phase that is truly important for timely group performance. Schippers et al. (1999) address the changes in the focus of reflection in different project stages. In the orientation phase, reflection is characterized by the joint consideration of the nature of the problem, the goals, and the strategies. In the execution phase, groups review whether they are still on track, whether the problem is being dealt with in a proper way, and how to accomplish task completion within the time available. From this we conclude that it is not merely reflexivity, but the specific attentiveness to task progression, time limitations, and ways to cope with them, that make some groups meet their deadline where others do not.

Based on these findings our knowledge of the factors influencing progress across different stages of group projects has been extended in several ways. First, the study shows that high and low potency groups react differently to high time pressure. Low potency groups are very susceptible to negative effects of high levels of time pressure in both the orientation phase and the execution phase. High potency groups, on the other hand, seem unconcerned with time pressure until it becomes really serious, and at that point they get motivated by it. For practice, these findings imply that putting high time pressure on project groups may promote performance in high potency groups, but low potency groups are likely to perform better under ample time conditions. Whenever working under high time pressure is inevitable, the project manager should pay special attention to stimulating group potency and finding alternative ways of motivating low potency groups than by stressing timeliness.

Second, in contrast with the findings on individual projects, this research suggests that execution planning contributes to performance in group projects, provided that the group has a clear view of the project goals and circumstances. In addition, we may conclude that reflexivity enhances timely group performance, at least if it is continued in the execution phase. Therefore, we recommend practitioners to make time available for in-process planning and reflexivity in all phases of the group project. We expect that, especially under high time pressure conditions, the continuation of reflexivity, with particular attentiveness to time limits and how plans should be adapted to enhance task progression, will facilitate timely project completion. In future research, we plan to capture additional information on the changes in the focus of reflection in different project stages, as well as the contributions of other types of planning to timely project completion.

In generalizing the results from this study to real-world project groups, some limitations of the present study should be addressed. First, as the research is based on self-report measures, it is difficult to determine the extent to which, for instance, reports of project progress reflect true characteristics. A respondent could mistakenly assume his group made a lot of progress because they engaged in a lot of planning and conferencing. This interpretation of progress would of course challenge the suggested directionality in the effects of planning and reflexivity on project progress. We acknowledge that the study would have been stronger if external assessment of progress had been made. However, having multiple raters from the same group providing very detailed reports on project progress gives some credence to the reliability and validity of the data. In a similar manner, potency equates to perceived ability. Although we expect group potency to be positively associated with actual group abilities, future research should investigate both constructs in order to distinguish between the effects of group confidence and the effects of true competences on project progress.

Second, it should be noted that the number of groups studied was limited and concerned student project groups. Therefore, we should consider the differences between "educational" projects such as the ones included in this study, and projects in the "real" world. Although the acquisition and project initiation phase was omitted in this study, we acknowledge that, in real-world organizational settings, this phase is often of great importance to project success and timeliness. Poor decisions and agreements made in this phase may confront project groups with unachievable project goals and unrealistic time scales that make successful and timely project completion practically impossible. In addition, the projects in our study took place under reasonably predictable circumstances, whereas many projects in organizational contexts are characterized by turbulence and uncertainty. Even though we have clearly established the value of planning under predictable circumstances, it remains unclear to what extent planning contributes to project progress in more dynamic organizational circumstances.

Without a doubt, these findings need to be replicated in a larger sample of project groups in a natural work-related setting in order to establish their validity for daily real-world project group practices. However, despite the relatively small sample size, we have been able to demonstrate clear relationships between group processes and the timeliness of project group performance.

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APPENDIX

Measure of progress

Response scale: 0% to 100% on an 11-point scale.

To what extent has your group completed the following tasks:

1. problem definition
2. plan for quickscan
3. interviews
4. preliminary report
5. presentation of preliminary report
6. plan for in-depth analysis
7. in-depth analysis
8. design
9. plan for implementation
10. final report