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The effects of individual time urgency on group polychronicity

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Abstract *Recent work concerning the effects of time on group behavior suggests that individuals' time-oriented behaviors may act as a catalyst or pacing mechanism for subsequent group behaviors. Other work suggests that group polychronic behavior (the group's performance of multiple tasks simultaneously) has significant effects on both individual and group outcomes. In this paper, we examine the relationship between individuals' time-oriented behavior and group-level polychronic behavior. Based on results from a laboratory simulation involving 26 small groups, we conclude that the presence of time-urgent group members increases group-level monochronic (versus polychronic) behavior and has a positive effect on groups' primary task activity.*

Businesses today often operate in competitive environments that are increasingly turbulent and unpredictable (Bartlett and Ghoshal, 1991). The timing of individuals', groups', and organizations' responses under such conditions has become crucial to firm survival. Perhaps as a consequence, many researchers of organizations are focusing more attention on issues of time and timing at various levels of analysis. At the individual level of analysis, researchers have investigated time urgency, or individuals' perceptions of deadlines and the rate at which tasks must be performed (Landy *et al.*, 1991). Time urgency has been linked to individual-level outcomes including task performance (Strube *et al.*, 1989; Bingham and Hailey, 1989) and Type-A behavior (Conte *et al.*, 1995; Landy *et al.*, 1991; Burnam *et al.*, 1975).

At the group level of analysis, researchers have examined the effects of timing and pacing in groups (Gersick, 1988, 1989; Kelly and McGrath, 1985). In particular, the work of Gersick (1988, 1989) suggests that individuals' time-oriented behaviors in groups may act as a catalyst or pacing mechanism for group task activity, and that some patterns of task pacing may be more effective for groups than others. Research in this area also indicates that the timing of adaptive behaviors in groups can result in differences in performance (Waller, in press).

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An additional and multi-level area of work focuses on polychronicity, or "the involvement of an individual or group with multiple tasks at the same time"[1] (Bluedorn *et al.*, 1992). People with a monochronic orientation prefer to complete tasks sequentially, while people with a polychronic orientation prefer to be involved with several tasks simultaneously (Hall, 1983). Similarly, groups may perform tasks sequentially, with the group moving *en masse* from task to task, or simultaneously, with the group distributing members across various tasks (Waller, 1997). Research in this area indicates that either individual- or group-level polychronic behaviors may affect outcomes at either level of analysis.

These three areas of research indicate that:

(1) individuals working under an identical time-pressured situation may exhibit very different time-oriented behaviors from one another;

(2) individual time-oriented behavior can affect subsequent group timing and pacing; and

(3) the timing and pacing of group activities can affect group outcomes.

While some empirical research examines the actual time-oriented behaviors of individuals, versus their propensity or likelihood to act, in actual group settings with consequential outcomes (e.g. Karau and Kelly, 1992), we know little concerning if and how individuals influence group pacing.

However, linkages among existing research areas provide a path of inquiry. The time urgency literature suggests that time-urgent individuals are more likely to voice concerns about time and timing (Strube *et al.*, 1989; Bingham and Hailey, 1989). Gersick's (1989) work suggests that individuals' utterances about time serve to pace the group working under a deadline condition. Finally, group-level polychronic behavior is a distinct pattern of pacing and time utilization that may have important implications for performance (Slocombe and Bluedorn, 1999). Thus, if individuals are more or less time urgent, and if individuals' time utterances serve to pace a group, what is the effect of individual attention to time on the group's polychronic behavior? Given the linkages among individual time-oriented behavior, group timing, and group outcomes, examining individual behavior as an antecedent to group timing and pacing behaviors may provide important clues for future research regarding overall group performance levels.

This paper is organized as follows: within a brief review of pertinent literature are incorporated two testable propositions. Details of a laboratory simulation are described, and the results of the simulation presented. The paper closes with a discussion of directions for future research and implications for practice.

Previous literature

Time urgency and attention to time

The time urgency literature suggests that individuals vary in their propensity to engage in several time-oriented behaviors, including overall attention to

time, performing many tasks simultaneously, being impatient, being punctual, controlling deadlines, and scheduling tasks (Conte *et al.*, 1995). Individuals who are time urgent tend to be more attentive to time and deadlines than other individuals (see Strube *et al.*, 1989), and attention to time by individuals may have different effects on the group. Well-placed attention to time by group members may catalyze the group and promote important transitions (Gersick, 1989). A highly time-urgent group member may act as a pacer to the group, voicing concerns about time and ensuring timely completion of assigned tasks and subtasks. Alternatively, excessive attention to time by a group member may have a detrimental effect on group task completion. For example, one individual in a group may exhibit significantly higher attention to time behavior than other members. While this person may to a certain point serve as a pacer or catalyst, beyond that point, the individual's warnings about time limitations or deadlines may lose their salience, may no longer have a positive effect on group behaviors, and may even become a distraction for the group.

Time urgency and polychronicity

Polychronicity involves, among other behaviors, simultaneous task involvement or performance (see Slocombe and Bluedorn, 1999). Wright (1988) also notes that individuals with high time salience are likely to perform multiple simultaneous tasks within an allotted amount of time; likewise, research on Type A and time urgency identifies simultaneous task performance as a key individual-level time urgent behavior (Conte *et al.,* 1995). Thus, as individuals with high time salience are motivated to accomplish several tasks simultaneously within a given time period, the same effect may be present in groups. Highly time-urgent group members, motivated by agitation regarding time limits, may also encourage higher levels of simultaneous task performance on a group level. As previously suggested, time-urgent group members may be successful in motivating this aspect of polychronic behavior in groups, but only to the extent that their motivation does not become a distraction. At that point, less time-urgent group members may ignore the suggestions for group polychronicity from the time-urgent members.

Given that multiple task performance has been identified as a key individual-level time-urgent behavior, and given the arguments above for both positive and negative effects of individual time-urgent behavior on group-level polychronic behavior, we offer competing exploratory propositions:

P1: The behavior of a highly time-urgent member will be positively associated with the level of group polychronicity.

P2: The behavior of a highly time-urgent member will be negatively associated with the level of group polychronicity.

The following study was designed to examine these propositions.

Methods

Subjects

Twenty-two groups of four people each and four groups of three people were randomly assigned to one of three conditions, for totals of 100 group members and 26 groups. Subjects were first- and second-year MBA or MS students at a large public university. Subjects were given one extra credit point on their final exam for participating in the study. In addition, subjects received $10 compensation for participating in the study, and were eligible to win a group-level competitive prize of $100. The prize and its usefulness in the research design are explained in detail below.

Design

Groups performed a creative task designed to replicate the characteristics of the creative task used in Gersick's (1989) simulation. The simulation required each group to create a one-minute radio commercial for Southwest Airlines. Written information concerning the client's content and budget requirements was given to each group 15 minutes before the simulation began. A large wall clock was clearly visible in the room. Groups were able to choose from a variety of music and sound effects available on compact discs, and had access to a compact disc player, blank paper and pens for planning purposes. They also had access to a two-way wireless intercom. They were told that on the other end of the intercom was their vice-president, with whom they could lobby for budget increases. The project assistants played the part of the vice-president and denied all such requests. A video camera was mounted in one corner of the room and all simulations were videotaped for subsequent analysis.

In an extension of Gersick's study design, groups were randomly assigned to one of three conditions:

(1) contracting time allocation;

(2) stable time allocation; or

(3) expanding time allocation.

These conditions were necessary for an additional study and were not represented as variables in the current study. The conditions served here only to create a range of situations under which individuals might exhibit time-urgent behavior. In all three conditions, groups were initially told verbally and in the written instructions that they had 60-minutes to complete the task. Ten minutes[2] after beginning the task, the groups working under expanded time limit conditions were interrupted by the researcher playing the role of the vice-president, and were told that, due to a scheduling error in Herb Kelleher's (CEO of Southwest Airlines) travel plans, they actually now had 70 total minutes to complete the task. Groups working under contracted time limit conditions similarly started working under a 60-minute deadline, and were similarly interrupted after ten minutes to be told that, due to the scheduling error, they now had 50 total minutes to complete the task. Groups working under stable

time limit conditions were not interrupted and were not told they had a new deadline. For all conditions, at the end of the allotted time a research assistant entered the room to audiotape the group's finished commercial.

All finished commercials were subjectively judged by the researchers for their overall quality. This judgment was the basis for awarding a cash prize of $100 to the winning group. The cash prize was necessary for this research design due to the "surprise" element of shifting deadlines. If subjects shared information about the experiment across groups, the effects of shifting deadlines might be contaminated by the subjects' anticipation of deadline shifts. The competitive cash prize was used to help decrease the likelihood that subjects would share information with others. This subjective judgment made by the researchers had no impact on data coding or analyses. The only function of the judgment was to award the cash prize. The prize was awarded one week after the data were collected, and, to maintain fairness across the conditions, one $100 prize was awarded to one group in each condition.

Measuring time urgency

In general, the time urgency literature focuses on individuals' perceptions of time urgency, their propensity to engage in time-urgent behaviors, or self-reports of past time-urgent behavior (see Landy *et al.*, 1991, for an example). The research typically does not use measures of the actual time-urgent behavior of individuals *in situ*. Unfortunately, self-reported measures of behavior or propensity to act are subject to a number of biases that may limit their predictive ability. In particular, social desirability may influence the answers a respondent gives on a time urgency instrument. For example, a respondent may perceive it to be desirable to report high levels of punctuality and scheduling behaviors, when in fact he/she does not behave this way. Conversely, a respondent may erroneously report low levels of impatience, believing this behavior is considered socially undesirable. In this study, we measured actual time-oriented behavior of individuals in groups.

Additionally, with a focus on and within the group, individual time urgency becomes relative to other group members' perceptions and levels of urgency. An individual high in time urgency who belongs to a group composed of other time-urgent individuals may have little social impact, but if that same individual was the only time-urgent person in a less time-urgent group, he/she might influence the group substantially. While the authors are unaware of literature that has studied the influence of time-urgent individuals on groups, the relational demography literature does examine the influence of unique individuals on groups. Findings from this literature such as those reported by Tsui *et al.* (1992) emphasize the need to consider levels of individual attributes relative to peers when studying groups. Specifically, Tsui *et al.* (1992) reported asymmetrical relationships with attachment to organizations depending on the race and gender of the minority in heterogeneous work groups. Thus, in this study we use relational measures of time urgency.

Coding

Two independent PhD students performed coding of several variables from the videotapes. Based on the literature previously reviewed, time urgent behavior was operationalized as attention to time. Interrater reliability (Cohen's kappa) for verbal and behavioral attention to time coding was 0.81. The coders discussed coding discrepancies until mutual agreement was reached. The frequency of verbalized time attention (e.g. "We only have five minutes left!") and the frequency of behavioral time attention (i.e. looking at the clock or at a wristwatch) were both coded per ten-second interval[3]. The ten-second interval coding was used in order to provide an initial fine-grained representation of group behavior from which to construct larger intervals. The ten-second intervals were aggregated into 4 percent of total task time intervals, resulting in 25 intervals per group in each condition. For example, groups in the contracted condition worked for a total of 50 minutes; thus, each of the 25 intervals per group under that condition was two minutes long. Each of the 25 intervals per group under the expanded (70 minute) condition was 2.8 minutes long. Figure 1 depicts this aggregation.

Group polychronicity data were coded by the two independent PhD students who tallied the group-level presence or absence of 15 different types of tasks per ten-second interval. The task types were developed to be comparable to Gersick's (1988, 1989) work, and to generally relate to stages in the problem-solving process: orientation (information gathering of reading materials, problem identification, information gathering of music and sound effects materials), alternative generation (identifying and developing commercial themes), evaluation and choice (selecting themes), development (developing the content and structure of the commercial), and implementation (scriptwriting and rehearsing). Additionally, two types of task maintenance activities were coded and reflected attempts to:

(1) prioritize the work or to move forward to a different activity; or

(2) assign major pieces of work to individuals or sub-groups.

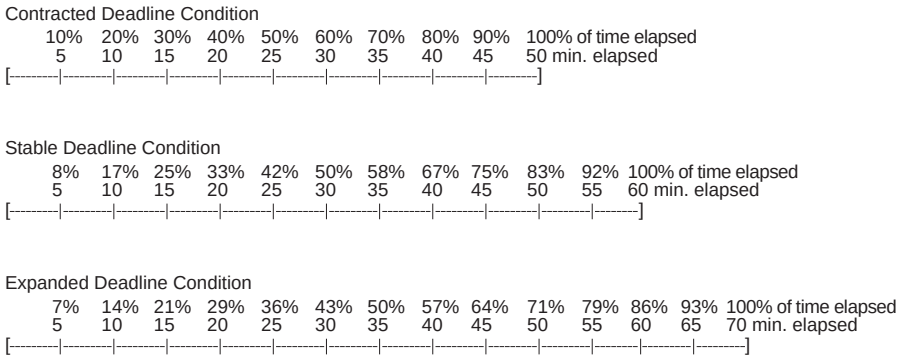

Figure 1.
Aggregation of time intervals into percentages of time elapsed

Three types of external requests from the group were coded and reflected requests for general information, questions regarding the budget, or questions regarding time constraints. Interrater reliability (Cohen's kappa) for the items as a whole averaged 0.75 per group. The coders discussed coding disparities until mutual agreement was reached.

Variables

The variables of interest here are individual time-urgent behavior and group polychronic behavior. Owing to the exploratory nature of this study, we developed alternative forms of these variables. Individual time urgency was initially measured as the individual-level sum of time-related behaviors (e.g. checking one's watch or the clock) and verbalizations (e.g. "We've only got five minutes left!"). To construct relational measures of time urgency, the level of individual time urgency in relation to other team members was identified through several related measures based on individual time-related behaviors and verbalizations. These measures were variations of two basic methodological constructs, a distance score (Tsui *et al.*, 1992) and a z-score. The distance score employed by Tsui *et al.* (1992) is a measure of Euclidean distance, and is low when an individual is similar to others in a group, and high when one is different. The score is frequently used in relational demography measures and is scored as

$$[\sum(S_i - S_j)^2/n]^{1/2}$$

where the target individual was represented by S_i and the comparison individuals were represented by S_j. While distance measures appear quite helpful in identifying relative differences between individuals in groups, they are not intrinsically helpful in understanding the direction of those differences. While distance scores are purely relativistic, time urgency may have a relative and an absolute component. A person may be considered highly time-urgent if he/she exhibits moderate time attentiveness but others in a group exhibit low time attentiveness, if he/she exhibits high time attentiveness while others are moderate, or if he/she exhibits very high time attentiveness regardless of the behavior of others in the group. Distance scores only make within-group comparisons, and are by their nature constrained by the behaviors or attributes of others. For example, one group's members exhibited 30, 31, 17, and 3 time behaviors plus verbalizations. Neither of the two highly time vigilant individuals had a high distance score because of:

(1) the presence of the other time-urgent member; and

(2) the presence of the unusually less time-urgent member.

Further, distance scores do not treat the group as a holistic entity, but make comparisons at an individual level. If one were trying to evaluate the time urgency of the second member of the aforementioned group, a hypothetical group compriseing others who exhibited 16, 17, and 17 time behaviors and verbalizations would yield a very different score (12.42 versus 15.66 in the

original group) even though the average of the comparison of others is identical between the real and hypothetical groups.

To manage this measurement dilemma, two individual time urgency measures were developed. One coding, URGENT1, standardized the distance scores within the group and applied the z-score of the most-time-urgent member. A second version, URGENT2, simply standardized the time behaviors and verbalizations of the individuals within the group and applied the z-score of the most time-urgent member.

Two measures of *group polychronicity* were also developed. One measure, FOCUS, identified the predominant phase of the problem-solving process per 4 percent interval by counting the tallies across tasks within a phase and applying that phase with the greatest overall activity, and dividing that total into the total task activity count, which was then averaged across intervals. Polychronic groups would be expected to score low on this measure (less performance of a single activity, more diversity of activity). Tallies were made indicating the presence or absence of a behavior (such as theme generation, evaluation, implementation etc.) in each ten-second interval. These tallies were summed across all ten-second intervals comprising a 4 percent interval. For example, 4 percent of a 50-minute session equals 120 seconds or 12 ten-second intervals. The sum of all the tallies represents the overall activity level within the interval. The focus value for that 4 percent interval is equal to the proportion of overall activity tallied in the primary task. For example, if a group had more tallies for theme generation (nine, for instance) than for any other task, and the group had 24 total tallies in the 4 percent interval, the group's focus value would be 0.375 for that 4 percent interval. The variable FOCUS as represented in our final analyses is the average of these focus proportions across all 4 percent intervals and therefore represents the degree to which the group was focused on its primary task at a given time relative to other tasks.

A second measure, DEVMONO, identified "deviations from monochronicity," which was captured by identifying that subset of phase transitions which either skipped the next logical phase of the problem-solving process, or switched back to a previous phase. Polychronic groups might exhibit more switching between phases. To understand deviations from monochronicity, it may help to visualize a normative problem-solving group. When coding behaviors for such a group, one would find early intervals focused on problem identification, followed by a transition to a focus on alternative (theme) generation, followed by a transition to a focus on evaluation and choice. These could be termed monochronic transitions. A deviation from monochronicity would occur if a group's task focus in an interval was followed by a task focus in the next interval which would not be predicted for a monochronic group. For example, if a group was focused on problem identification in one interval and on evaluation and choice in the next, or if a group went "backwards" from theme generation to problem identification, the group would be experiencing a deviation from monochronicity. The count of these deviations was summed across all intervals for each group.

An additional variable included in our analyses is group time behavior. As previously noted, time-oriented behaviors were coded as present if an individual made an explicit (e.g. "It's already 10:45!") or implicit (e.g. "We need to wrap this up soon") time-related verbalization, or if a member performed a non-verbal behavior such as checking a clock or a watch. At the group level, the value for group time behaviors was calculated by taking the sum of all time behaviors and adjusting for the number of group members and the amount of time allotted to the group. The variable "group time behaviors" thus represents the number of time-related verbal and non-verbal behaviors per member per hour. This variable is included in our analyses to control for the overall group level of time awareness.

Analyses and results

Descriptive data are presented in Table I. The analyses reported here used correlations of variables, also presented in Table I. Correlations between measures of time urgency and polychronicity indicated a negative relationship. Both URGENT1 and URGENT2 were significantly and negatively related to deviations from monochronic progress through phases of the problem-solving progress.

Polychronicity measures were regressed on time urgency measures. Control variables for these regressions included BATCH (one of two batches of subjects in the study), CONTRACTED and EXPANDED experimental conditions (with the STABLE deadline condition as the omitted dummy variable), and the total tally of each group's time behaviors. Linear and quadratic effects of time urgency were tested. Quadratic effects were thought to be possible because an extremely time-urgent person might induce group polychronicity by making a

Variables	Mean	SD	1	2	3	4	5	6	7
Control variables									
1. Batch	0.58	0.50							
2. Contracted experimental condition	0.31	0.47	–0.10						
3. Expanded experimental condition	0.35	0.49	–0.03	0.49*					
4. Group time behaviors	0.15	0.64	–0.22	0.39$^{\#}$	0.25				
Time urgency									
5. URGENT1	0.31	0.30	–0.16	–0.20	0.22	–0.06			
6. URGENT2	0.46	0.43	–0.17	–0.16	0.27	0.00	0.92**		
Polychronicity									
7. Average focus on primary task	0.62	0.07	0.74**	–0.10	0.07	–0.07	0.08	0.10	
8. Deviations from monochronicity	0.39	0.17	0.43*	–0.07	–0.02	–0.21	–0.41*	–0.34$^{\#}$	0.09

Notes: n = 26 groups; $^{\#}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$

Table I.
Means, standard deviations and correlations for all variables

group excessively concerned about tightness of time, but no significant curvilinear effects were found. To conserve degrees of freedom and increase the power of the models, trimmed models were also tested. Trimmed models only included significant control variables. Regression results are presented in Tables II and III for average focus on the primary task (FOCUS) and deviations from monochronicity (DEVMONO), respectively.

Tables II and III both indicate that the presence of a time-urgent individual in a group decreases polychronicity. This finding was robust across both operationalizations of time urgency. Specifically, time-urgent individuals were associated with increased focus on the group's primary task, and time-urgent individuals were associated with fewer deviations from monochronic progress through phases of the group's problem-solving process. These results do not support *P1* and do support *P2*.

Discussion

The results indicate a negative association between individual time urgency and group polychronic behavior. The time-urgent individual in a group may have served to keep the group focused on its primary task while marching sequentially through phases of group problem solving. However, there are at least two other possible descriptions of these results. First, the relationship between individual time urgency and group polychronicity could be in the shape of an inverted U. The relatively small sample size of 26 groups may have provided data that represented only the rightmost portion of that curve. Second, the group dynamics literature provides several examples of the effects of group size on group behaviors, and that larger groups tend to disassemble into subgroups more readily than do smaller groups (Shaw, 1976, p. 155). Recall that the groups studied here were either three- or four-person groups. It seems possible that a time-urgent individual might perceive these groups as too small to break into subgroups across multiple tasks. While the measurement of actual time-urgent behavior and examining the relationship between this

	Dependent variable version			
	URGENT1		URGENT2	
	Full	Trimmed	Full	Trimmed
Independent variables				
Batch	0.108**	0.150**	0.109**	0.105**
Contracted experimental condition	–0.002		–0.004	
Expanded experimental condition	0.002		–0.001	
Group time behaviors	0.001		0.001	
Time urgency	0.005	0.005#	0.004#	0.004*
Adjusted R^2	0.52	0.57	0.53	0.58
F	6.45**	17.41**	6.61**	18.05**

Notes: n = 26 groups; # $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Table II.
Regressions of average focus on primary task

Table III. Regressions of deviations from monochronicity

	Dependent variable version			
	URGENT1		URGENT2	
	Full	Trimmed	Full	Trimmed
Independent variables				
Batch	1.10$^{\#}$	0.125*	1.15$^{\#}$	1.29*
Contracted experimental condition	0.17		0.27	
Expanded experimental condition	0.56		0.58	
Group time behaviors	–0.06		–0.05	
Time urgency	–0.22*	–0.19*	–0.13$^{\#}$	–0.11$^{\#}$
Adjusted R^2	0.18	0.25	0.11	0.19
F	2.10	5.06*	1.62	3.96*

Notes: n = 26 groups; $^{\#}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$>

behavior and group polychronicity adds new information to the literature, these two possible explanations offer important directions for future inquiry.

Additionally, this paper provides a foundation for contributions in at least three other areas. First, the investigation of individuals' time-oriented behavior and how such behavior affects overall group performance serves to begin integration between the two levels of analysis. While research on time and timing in groups is a relatively new area of inquiry, research on individual-level time urgency and time perception is fairly mature. According to Whetten (1989), learning more about how similar processes operate, and possibly operate differently, at different levels of analysis can provide important theoretical contributions. Future research could use some time-related behaviors at the individual level as analogs for group-level behaviors while identifying differences in behaviors between the two levels.

Second, much of the previous research concerning time-urgent behavior has focused on the development of self-report instruments useful in identifying an individual's propensity to act in a time-urgent manner. Because our study focused on the effects of individual time-urgent behavior on group outcomes, we chose to measure actual individual behaviors rather than the propensity for these behaviors. This measurement provided two benefits. First, we were able to avoid any "slippage" between propensity and actual behavior in individuals. Second, few researchers have attempted to measure actual time-urgent behaviors, and we were thus able to exercise more exploratory latitude in developing a variety of operationalizations for these behaviors. These operationalizations provide a broader view of the translation of time urgency from propensity to manifested behavior.

Finally, our results suggest that future research may ultimately provide key information for managers of groups. Based on results from future laboratory and field studies in this area, it could prove to be important for managers of groups to consider individuals' potential for time-urgent behavior when composing work groups and teams for various tasks. For example, team composition based on individuals' time-urgent behaviors may be particularly important for teams working under time-pressured situations. Overall, the

time-oriented behaviors of individuals have the potential to affect outcomes at both the group and organizational levels, and the study of such dynamics may be a promising expansion of inquiry at all levels.

Notes

1. While polychronicity, as conceptualized by Hall (1983), is multidimensional, we limit our focus here to the simultaneous task involvement aspect of polychronicity. This aspect has also been referred to as polyphasic behavior (Wright, 1988).
2. The researchers pilot tested groups that were interrupted after five, ten, or 15 minutes had elapsed. Qualitative interviews with pilot group members indicated that an interruption after ten minutes created a salient time condition without creating undue stress regarding the possibility of completing the task by the shorter deadline. Interviews further indicated that interruptions after five minutes had elapsed had very little effect on time salience.
3. Gersick's previous work focused on time-oriented verbalizations. We reasoned here that time-oriented behaviors, in addition to verbalizations, could also be coded and might offer additional insights as to the effect of time on group processes.

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