Asking the How Questions: Quantifying Group Processes Behaviors

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ABSTRACT. The authors analyzed the group work behaviors of 132 grade school students to assess behavioral manifestations of group processes. The authors coded videotapes of students working together on a math-learning task to quantify the incidence of microbehaviors associated with process loss and process gain (I. D. Steiner, 1972). Factor analysis of 11 categories of coded behaviors revealed 3 factors that accounted for 67% of the explained variance. The factors were interpretable as process gain (PGV), process loss behavior directed outside the group (PLV-out), and process loss behavior directed into the group (PLV-In). The authors discuss correlations among variables derived from the factors and with other measures. Results support this method of quantifying group processes. The authors considered implications for the broader study of group processes.

Key words: accountability, cooperative learning, education, group dynamics, social loafing, Steiner

EXPLAINING AND PREDICTING HUMAN BEHAVIOR IN GROUPS composes a substantial body of literature, largely extended from Steiner’s (1972) early conceptual work. Steiner’s simple but influential model of the relationships among factors that affect group productivity continues to generate research in this area. The model is useful in that it helps define and refine the empirical questions asked about groups. According to Steiner, task performance in groups is the product of potential productivity minus process loss. He defined potential productivity as the combination of resources and task demands. Process loss is the sum of coordination loss (due to difficulty coordinating efforts of multiple participants) and motivation loss.

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The empirical literature that has emerged around group processes has focused primarily on what Steiner terms process loss (when and why groups fail). The research has specified a host of group interaction phenomena that are largely derivative of Steiner’s original process loss concepts (Battisch, Solomon, & Delucci, 1993). Among the variables identified are social loafing and social compensation (Williams & Karau, 1991); exit from group (Yamagishi, 1988); perceived value to group and perceived status in group (Littlepage & Silbiger, 1992); felt dispensability (Weldon & Mustari, 1988); free riding, evaluation apprehension, and production blocking (Diehl & Strobe, 1987, 1991); trust (Dirks, 1999); task type and team size (Curral, Forrester, Dawson, & West, 2001); and group cohesion (Webb, 1989). The success or failure of group efforts is thought to be predictable by knowledge of the constellation of these and similar variables. Further, those variables can be manipulated to optimize or sabotage group work.

Group processes researchers have traditionally relied upon comparisons between individual and group productivity or later performance as evidence that process losses have occurred. The available quantitative research generally relies on speculation about the connections between group configuration and people’s behavior in groups. For example, scholars conclude that social loafing has occurred if participants produce less output when they believe that they are part of a group effort than they do when they believe they are working alone. Erez and Somech (1996) observed that often the actual group is nominal only. Even when the groups are real or participants interact, researchers most often quantify outcome measures such as task performance and focus on individual performance outcomes rather than on interaction among group members or on specific group work-related behaviors (Karau & Williams, 1993). Other work relies on self-reports of participants’ perceptions of group interactions (Watson & Michaelsen, 1988; Watson, Johnson, Kumar, & Critelli, 1998).

The findings of such investigations are useful in validating group processes constructs, in demonstrating that different configurations affect people’s behavior in groups, in allowing for the creation of taxonomies for when people respond to particular contexts, and for discovering optimal configurations of groups for practical purposes, but are limited in their explanatory use. These findings tell us little of the processes and behaviors that comprise and underlie grid constructs such as social loafing and production blocking. There has been essentially no attempt to directly assess the behavioral manifestations of such group processes variables.

Left unanswered (and unasked) are questions of how (descriptively and functionally) peoples’ behavior differs depending on the configuration of the group and how those behaviors interact with the environment to yield different productivity outcomes. A more direct assessment of group processes variables could provide a specificity that would advance our understanding of the functional mechanisms through which group process lead to differences in anything.

Some of the important practical implications of group processes research are reflected in the historical association between group processes research and
industrial and organizational psychology. We hope that the present research contributes to that tradition. Group processes scholarship also has compelling implications for other contexts in which groups figure prominently, including classroom education. An extensive literature on groups convened for learning purposes (i.e., cooperative learning) has developed in the last several decades, which could similarly benefit from the advancements this line of research would enable.

In our present investigation, we sought to extend group processes research by examining the behavioral manifestations of group processes variables.

Process Loss: Accountability and Group Dynamics

The major process loss variables cited in the literature can be grouped under two main dimensions: those involving attitudes about participation and those concerning the negotiation of interaction among multiple participants. Social loafing, felt dispensability (Weldon & Mustari, 1988), free riding, and evaluation apprehension (Diehl & Strobe, 1987, 1991) sort into the first category, accountability. Others, including exit from group (Yamagishi, 1988), production blocking (Diehl & Strobe, 1991), and cohesion that involves the coordination of member efforts (Webb, 1989), are associated with the second category, group dynamics.

The two process loss categories conceived for this investigation are similarly tied to perceptions that drive participation and to interaction patterns of group members. They are related to Steiner's motivation and coordination categories; however, our review of the literature indicated that motivation plays a part in both of the major categories of process loss variables that have emerged from the literature. We determined that issues of motivation related to accountability should stand apart from those which might be associated with coordination and so made a cleaner distinction. The categories are defined as follows:

1. Accountability: Member attention is preoccupied with the possibility of external evaluation such that the threat of negative evaluation, or the preoccupation with a favorable evaluation from an external evaluator, is likely to affect effort or contribution. Thus, perceived information, accountability, or evaluation present in a group setting informs the quality of a person's work (rather than task or group responsibility). In the group setting, if there is no information that will be available about one's work or no accountability or consequence likely to follow from one's efforts, one will likely loaf, reduce level of effort, or not make high-quality contribution to the group product. The reverse is also true.

2. Task-Hindering Group Dynamics: These are disruptions or inadequacies in the dynamics of group functioning. This entails difficulties in communication between group members; lack of consensus in approach to the task; disagreements or problems tied to the fair distribution of various members' contributions; lack of coherence in the distribution of labor;
lack of receptivity to certain members’ input; and time wasted in faulty, unhelpful, or irrelevant input. This also includes members working independently during group-oriented tasks.

We created a measure designed to quantify group processes at the level of specific behaviors. Our goal was to operationalize process loss in the observable behavior of people working in groups. We then validated the instrument, using it to observe and assess the incidence of these behaviors among students as they worked in groups of three on a math-learning task.

We chose the sample for study because although much of the previous research has emanated from the organizational psychology literature or is oriented toward the implications of group processes for groups convened for workplaces, there are equally compelling implications for groups convened for educational purposes (Johnson & Johnson, 1994). The literature on cooperative learning has impressive laboratory support but mixed classroom results (Hill, 1982; Slavin, Hurley, & Chamberlain, 2001). Battisch, Solomon, and Delucci (1993), described this gap also by noting the absence of a group processes analysis of cooperative learning groups despite the obvious relevance of the associated concepts. Our research predicted that group processes behaviors would be observable and quantifiable in the behavior of children working in groups.

**Method**

**Participants**

Participants were 132 African American (n = 75) and European American (n = 57), female (n = 71) and male (n = 61) fourth (n = 68) and fifth (n = 64) grade students sampled from urban public schools in the Northeastern United States.

**Instruments**

*Behavior coding.* The use of videotaped observations has become well established in behavioral research. A heightened level of detail and the unlimited opportunity to revisit observations are among the advantages of videotaping. Used appropriately, such methods can contribute significantly to the reliability and validity of observations (Fagot & Hagan, 1988; Hecht & Roberts, 1996). However, essential to their appropriate use is that sufficient attention be paid to the conceptual and theoretical underpinnings of the research. By coding and analyzing for specific behaviors associated with long-standing concepts in group processes literature, we capitalized on the advantages of videotape analyses to examine the functional mechanisms through which group processes variables can affect group interactions.
Behavior categories. We coded seven categories of process loss behaviors for each participant. Each category is comprised of several exemplary behaviors, which are specifically counted during the coding process. The seven categories are:

1. *Preoccupation with authority figure*: behaviors such as frequent checking with or addressing the obvious figure of authority (in this case the experimenter).
2. *Preoccupation with others in group*: frequent checking on or with other group members.
3. *Off-task passive (spacing out)*: sitting away from the others, the materials, the workspace, etc.
4. *Off-task aggressive*: off-task comments and attempts to distract others’ attention away from the task.
5. *Directing-controlling*: attempts to control or structure the assignment of roles and the behaviors of others in the group.
6. *Resistant aggressive*: includes comments about and criticism of the group’s activities such as complaining about others not helping.
7. *Resistant passive-aggressive*: behaviors that violate or disrupt the cooperative interactions of the group, such as blurting answers out of turn.

A panel of individuals versed in the relevant literature—advanced undergraduate and graduate psychology students and faculty—developed the behavior coding categories. The process used a top-down process and then a bottom-up process. First, we convened a five-person panel to identify behaviors of interest. Beginning with the definitions of accountability and task hindering group dynamics described above as a resource, panelists individually generated lists of behaviors characteristic of process loss. We compiled these lists and eliminated overlapping behaviors. Next, the panel evaluated each of the candidate behaviors for appropriate designation as process loss (i.e., whether a behavior was group work hindering), and assessed the distinctiveness and identifiability of each of the behaviors (i.e., if it could be picked out and easily distinguished from other behaviors). Third, we evaluated the item descriptions for clarity and consistency with the behavior in question. We then sorted the resulting lists of behaviors into the seven aforementioned sub-categories. Because of the exploratory nature of this work, we did not yoke the seven categories to the two main conceptual categories, accountability and task hindering group dynamics. Rather, we coded the seven independently and without reference to their origin.

A second panel then examined the coding scheme using a bottom-up process. The second panel began its work by evaluating the seven subcategories of behavior. To do this, each panelist rated each category definition for its face validity as a category of behaviors related to group work and which would be group work hindering. Agreement was unanimous in this. The panel then rated the category
definitions for conceptual clarity. The second panel negotiated disagreements and ambiguities to consensus.

Next, in a separate session, this panel examined the representativeness of the behaviors that had been assigned to each category. To do this, we separated the category definitions from the exemplars, and asked panelists to sort them into the categories as they thought appropriate. We revised or eliminated items on which there was significant disagreement. The final list contained 124 behaviors distributed across the categories. Finally, the second panel also evaluated the distinctiveness and identifiability of the behaviors as well as the clarity of the descriptions of each behavior. This resulted in minor revisions to the wording of some exemplars.

We adapted four additional categories from Ashman and Gillies’s Observations Questionnaire (1997), a video rating scale designed to assess the group learning behavior of trained cooperators versus untrained cooperators. We included these four categories to provide tests of discriminant and convergent validity in the coding procedure, because each of these four variables has a predictable theoretical relationship with both process loss and task performance. We also included them as an exploratory measure of Steiner’s process gain. These categories were (a) *Involvement*: students expressed understanding of the task and their active engagement; (b) *Communication effectiveness*: behaviors such as listening, explaining, and keeping eye contact; (c) *Participation*: behaviors that indicate effort in general, as well as things such as seeking consensus; and (d) *Affect*: behaviors such as smiling or frowning.

**Questionnaire.** The Process Loss Questionnaire (PLQ), is a self-report measure of group work related behaviors and experiences. The scale assesses participants’ perception of process loss behaviors that occurred in their learning groups. Items are presented in a 4-choice Likert-type format with options ranging from never to very often, and assigned the numerical values 1–4. Examples of the items include the following: “someone interrupted me when I was talking” and “I looked at the experimenter.”

**Math estimation pre- and posttests.** The math estimation task consists of a short introduction to estimation and 15 estimation-in-multiplication problems presented in a multiple-choice format. Pre- and post-tests are the rotated split halves of a 30-item test developed for this research. The two test forms are designated 1 and 2.

**Study session materials.** The math estimation learning task involved the students working together on an 11-page workbook designed to teach the basic concepts of the nice number estimation strategy (Reys, Reys, Trifton, & Zawojewski, 1985) through examples, activities, and narration. The nice number computational estimation strategy involves rounding the numbers in a problem to the nearest nice number and then calculating mentally to make an estimate for the original equation. The workbook format was designed from a survey of literature in mathe-
matics instruction manuals for teachers, (Hazekamp, 1986; Ockenga & Duea, 1985; Reys et al., 1985; Rubenstein, 1985), and with input from active teachers (N. Bordelon, 1995, personal communication; D. E. Sauve, 1995, personal communication). Pilot data for the workbook indicated that it was an effective tool for conveying the desired skills and that those skills were accessible to fourth and fifth grade students.

Procedure

Sessions. We conducted experimental sessions in unused classroom spaces in which three individual student desks and one table with three chairs around it had been arranged. We pretested and posttested students on a math estimation task at individual desks before and after they had participated in a 15 min videotaped study session. An experimenter was present but did not participate in the study sessions. During the study sessions, we seated groups of three students who sat around one small table while they worked on the math-estimation learning task. Participants shared one set of materials per session. We administered the questionnaires after the posttest. Upon their completion of the questionnaire, we thanked and debriefed students and escorted them back to class.

Coding. We coded the seven-process loss and four-process gain categories of behaviors for each child. The definition of each category included a number of exemplary behaviors (see Appendix A). For the seven categories of process loss behaviors, coders watched one child at a time and kept a running count of behaviors in one category. Coders advanced the count for a category each time any of the exemplary behaviors was exhibited. For behaviors that are continuous in nature, we instructed coders to count the behavior again after an interval of 5–8 s depending on the behavior in question. We adopted this procedure in an effort to capture the distinction between brief and extended exhibitions of a behavior. For example, if a child, without speaking, looked at the experimenter continuously for more than 8 s, we recorded another instance. Although we chose the interval lengths to reflect the nature of the associated behavior, we chose their lengths more to standardize procedures for coding reliability than because of their conceptual meaning. We recorded separate shorter incidents individually. After watching and coding a child on one category of process loss behaviors, three coders then rated the child on each of the four process gain variables. They rated process gain on a 10-point Likert-type scale ranging from not at all characteristic to very characteristic, which were assigned numerical ratings from 1 to 9. We rated the affected category on a scale from very positive to very negative. Thus, we rated each of the process gain variables three times for each participant and we created an average rating for each of these variables. We collected three ratings to increase the reliability of the resulting scores because ratings involve more judgment than do counts. These ratings were reliable at $r = .76$, $.76$, $.79$ and $.59$ for the involved,
communicated, participated, and affected categories respectively. To assess coding reliability for the process loss categories, a different person coded a 10% subset of participants a second time in each category. The correlation between the two codings ranged from .97 to .77 in each of the seven process loss categories. In all, we coded 11 group-process variables, each representing one of the behavior categories, for each child.

Results

Observation Data

We subjected data from the 11 group-process categories to a principal components factor analysis. This analysis allowed us to determine the factors underlying the categories of behavior that were coded. We considered factors with eigenvalues greater than 1. Varimax rotation determined three orthogonal (uncorrelated) factors, which accounted for 67% of the common variance among the categories. Factor 1 accounted for 35.6% of the explained variance, Factor 2 for 20.4%, and Factor 3 accounted for 10.6% of the explained variance. We assigned group process variables to the factor on which their loading had the greatest absolute value in order to create a set of mean scores for further analysis. We assigned each category to only one factor.

The four process gain categories loaded highest on the first factor. We called this factor Process Gain-V (PGV), where V denotes that the variable is derived from data coded from videotapes of the study sessions. The second and third factors both contained categories that would contribute negatively to group progress. Although they did not distinguish accountability and task hindering group dynamics as expected, these two factors were still conceptually interpretable. Factor 2 included behaviors that are primarily focused outside of the group interaction (e.g., looking at the experimenter), while the third factor included behaviors focused inside the group interaction (e.g., commenting on the level of others' contributions). We called these factors Process Loss Out (PLV-Out) and Process Loss In (PLV-In), respectively. Table 1 displays the factor solution. The factor solution is supported by the data for commonalities, which were moderately high, in the range of .6. This exceeds the criteria established by MacCallum, Widaman, Zhang, and Hong (1999). Their results suggest that a factor solution with communalities in the range of .5 should generally not be difficult to replicate when the factors are well determined and the sample is relatively large (100–200). These data meet both criteria because three factors emerged, each with three or four indicators, and the factors are consistent with a strong theoretical base. As previously reported, the sample size used here is within the recommended range for stability (N = 132). Using the factor solution as a guide, we generated scores for PGV, PLV-Out and PLV-In by computing the mean number of behaviors counted in the categories included in the factor cluster. Means for the group
TABLE 1. Group Process Factor Loadings

<table>
<thead>
<tr>
<th>Rotated factor matrix item</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Preoccupation with the evaluator</td>
<td>-.01320</td>
</tr>
<tr>
<td>Preoccupation with other members</td>
<td>-.04005</td>
</tr>
<tr>
<td>Off-task passive</td>
<td>-.43197</td>
</tr>
<tr>
<td>Off-task aggressive</td>
<td>-.28085</td>
</tr>
<tr>
<td>Directing and controlling</td>
<td>.12040</td>
</tr>
<tr>
<td>Resistant aggressive</td>
<td>-.42315</td>
</tr>
<tr>
<td>Resistant passive-aggressive</td>
<td>-.12496</td>
</tr>
<tr>
<td>Involved</td>
<td>.91819</td>
</tr>
<tr>
<td>Communicated</td>
<td>.93733</td>
</tr>
<tr>
<td>Participated</td>
<td>.94710</td>
</tr>
<tr>
<td>Positive affect</td>
<td>.70667</td>
</tr>
</tbody>
</table>

Note. Boldface entries represent highest factor loading for that item.

processes variables were PGV: $m = 5.19, SD = 1.59$; PLV-In: $m = 4.08, SD = 3.11$; and PLV-Out: $m = 5.69, SD = 4.45$.

Questionnaire Data

We entered the original 21 items of the questionnaire measure of process loss (PLQ) into an unrotated principal components factor analysis to determine which items best assess the common underlying construct. We used factor analysis to further construct development rather than simply establishing scale reliability. This analysis yielded seven factors with eigenvalues greater than one. The seven factors accounted for 63% of the common variance. That there were seven factors is unremarkable because the items were derived from a literature, which, as described earlier, identifies at least that many process loss variables. The analysis of this questionnaire focused on the single common construct (process loss) underlying such variables.

We used the factor solution to guide in the selection of process loss items. We selected items that loaded better than .30 on the primary extracted factor for further analysis. This procedure eliminated 8 items. The remaining 13 constitute what will hereafter be referred to as the Process Loss Questionnaire (PLQ). Appendix B displays these items. Internal reliability estimates for the 13-item PLQ yielded an alpha coefficient of .78.

We computed mean scores on the PLQ for each participant by summing the rating for each item and dividing by 13, the number of items. Higher mean scores
The mean PLQ score for the sample was 1.97 (SD = .50), near the option labeled sometimes, which indicated that participants did perceive that the behaviors in question occurred in their groups.

**Performance Data**

We assessed performance on the estimation task by a simple count of the number of problems correctly answered on the pre- and poststudy session tests. Mean pretest scores for the sample were better than expected by chance alone (M = 5.13, SD = 2.79, 34% correct). Participants appeared to have some basic number competency if not prior experience with estimation, but were not skilled estimators. Posttest mean scores for the sample were 8.17 (SD = 4.07; or 54% correct).

**Correlation Data**

We examined the three variables that were extracted from the videotaped study sessions for patterns of intercorrelation among them and with the other measures. Although the zero order correlation patterns were essentially the same, we used partial correlations to control for the effects of pretest performance and to control for prior skill with the task. Tests of predicted relationships were one-tailed. Table 2 shows significant intercorrelations and p values.

PLV-Out was positively correlated with PLV-In (r = .49) as expected for these two variables, both of which would contribute negatively to group outcomes. PLV-Out was negatively correlated with PGV (r = -.26). This relationship was also expected. PLV-Out was also positively correlated with PLQ indicating the same expected conceptual relationship but across assessment modes. The pattern is similar for PLV-In. PLV-In was correlated negatively with PGV (r = -.43), indicating the expected relationships among these group processes variables. PLV-In was also positively correlated with PLQ (r = .24), again showing the expected conceptual relationship across assessment modes. PGV was not related to PLQ. In addition, there was a small (r = -.19) but significant negative correlation between PLV-Out and posttest performance on the estimation task and between PLQ and posttest performance (r = -.15) indicating the expected, perhaps functional, relationship between behavior during group work and group-work outcomes. The correlation between our exploratory measure of process gain and performance on the math estimation task was near zero (r = .05).

**Discussion**

We created and tested a protocol for observing and quantifying behaviors associated with group processes. Analysis indicated three factors that were interpretable...
as process loss behaviors directed into the group interaction, those directed outside the group interaction, and behaviors that would enhance group interaction. There was indication of stability in the factor solution. The pattern of correlations among the variables generated from the factors was generally consistent with our expectations. Those that were positively correlated were of the same theoretical valence with respect to their effect on group interaction (e.g., variables whose conceptual relationship with group functioning was negative were positively correlated with each other). Variables of different valence were negatively correlated. The relatively strong relationship between behaviors directed into and those directed outside the group interaction indicates that these two variables share an underlying factor that we might assume is process loss. The relationship is not so strong as to render them indistinguishable from each other. These findings lend needed convergent and discriminant validity to our measurement of the constructs of interest.

Particularly encouraging is the criterion validity lent to our assessment by the observed relationships between our video-coded variables and students’ self-reports of process loss. The cross-method correlation is an indication that the coding protocol assesses something similar to students’ own experiences of their groups. Though our exploratory measure of process gain served in its role as a benchmark of discriminant validity, it did not have its predictable negative relationship with students’ self-reports of process loss or with performance on the estimation task. This finding may highlight the benefit of quantifying specific actions rather than global behaviors such as engagement.

That two of the process loss variables were correlated with performance gives further indication that the behaviors we have theoretically associated with learning group performance are assessable and empirically related to performance in learning groups. It is interesting that PLV-In was uncorrelated with performance. It seems plausible that process loss behaviors directed into the group interaction would have a more complex relationship with performance outcomes than behaviors directed
outside the group. For example, awkward trying, as compared with not trying, might result in a positive relationship with performance in so much as it involves a certain level of engagement. Our methods in this study do not allow us to distinguish between purely disruptive behavior and poorly coordinated, but genuine, efforts. The distinction may actually be tied to individual differences among participants. In future studies we will further investigate this relationship.

The categories of behavior coded from videotape were derived from an analysis of group processes literature. We organized the emerging factors into three categories that are similar to the theoretical categories defined for this type of research, and there was indication of stability in the factor solution. Despite this, the grouping of behavior categories with theoretical categories was not perfect. For this reason, it seemed premature to simply reassign the theoretical labels to the identified factors. Instead, we noted the similarities and will allow each to inform development of the other until such a time as the match between theory and observation is more complete and stable.

Bearing that in mind, our PLV-Out factor is similar in its composition to the accountability construct described here and elsewhere (Hurley, 1997). In fact, it seems even more similar to social loafing and free riding, which are presumed to result from low accountability (Abrami, Chambers, D'Apollonia, Farrell, & De Simone, 1992). Social loafing is defined as the tendency to withhold or reduce effort in groups when one’s contribution relative to other group members cannot be assessed (Steiner, 1972). A measure of behaviors directed outside of the group interaction would seem a reasonable indicator of whether a person is social loafing. There is a similar relationship between free riding and accountability.

Our PLV-In factor is comparable to the task-hindering group dynamics construct described here and elsewhere (Hurley, 1997). We defined task hindering group dynamics as disruptions or inadequacies in the dynamics of group functioning. Participants’ exhibition of process loss behaviors directed into the group interaction would seem symptomatic or even the underlying cause of task hindering group dynamics; so, again, there is a notable overlap between the construct identified for this research and the factor identified in the data.

In all, these findings are encouraging. Together they indicate that it is feasible to quantify group processes variables as they operate in learning groups. By coding and analyzing for specific behaviors, we took steps toward posing the “how” question that currently elude group processes scholarship. Further development and refinement of these methods should prove to be very useful in our continued efforts to understand the functional mechanisms through which group processes affect and interact with group-related behaviors and outcomes.

In addition to the conceptual and theoretical advancement that this mode of observation may one day generate, our work has implications for groups convened for practical purposes. For example, this study may lead to the development of assessment, training, and intervention techniques that would allow teachers to facilitate group interaction in classrooms. This may help to close the gap
between laboratory and classroom results of cooperative-learning strategies (Battisch et al., 1993). This line of such research promises to have a similar practical use in any number of other contexts where the outcome of group interactions is of particular consequence.

**Limitations and Future Directions**

This study, though an encouraging beginning, is limited in important ways. First, whereas our coded categories showed predicted relationships with other variables, those relationships could have been stronger, particularly with performance on the math task. Our work to refine this methodology will be aimed at identifying behaviors more clearly related to group work outcomes. Secondly, we set out to identify specific behaviors associated with Steiner’s (1972) process loss. To do this, we began with a host of variables that have emerged from previous attempts to conceptualize process loss. Our examination of this literature yielded two categories: accountability and task hindering group dynamics, which seem to have fair conceptual clarity. Our data betray a limitation to the approach we have taken in operationalizing them. While conceptually distinguishable, they are nonetheless psychosocially complex and should be expected to manifest themselves in complex patterns of behavior. Even if the overall patterns for the behavioral expression of each were distinguishable, there would certainly be an overlap at the level of individual behaviors. Thus a person whose group behavior is attendant to accountability might just as well hinder the dynamics of the group functioning in the absence of such accountability. Similarly, difficult group dynamics might likely be more or less outcome hindering depending on the accountability driven motivation of group members. The inevitable overlap in the behaviors that contribute to process loss seems an indication that, in future research, it may be better to pursue the operationalization not of conceptual variables, but of categories of behavior associated with process loss, independent of the psychological processes that motivate them in a given situation. It seems fortunate that while we attended to the conceptual categories as a resource, our operationalization and analysis did not force them.

Although our reasons for choosing to sample among grade school students are compelling, they also limit our ability to generalize the findings to groups of other ages and in other circumstances. We feel strongly that the basic principles of this methodology will generalize, but additional research is needed to confirm this.

**REFERENCES**


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**Appendix A**

**Observation Coding Categories and Exemplar Behaviors**

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**Accountability**

1. **Preoccupation with authority figure (experimenter)**
   a. Looks (only) at experimenter
   b. Looks at experimenter for confirmation of own contribution
   c. Looks at experimenter for confirmation of others contribution
   d. Asks experimenter for confirmation of contribution own
   e. Looks at the clock
   f. Looks at camera
   g. Announces progress info to experimenter

2. **Preoccupation with others**
   a. Looks (to monitor) at other students progress
   b. Comments on the level of other contribution (+ or –)
   c. Looks at others to assert own contributions
   d. Announces own progress/contribution to others in group
   e. Asked others to acknowledge their contribution

3. **Off-task passive (Spacing out)**
   a. Quiet/Passive
   b. Dreaming/playing with hair, jewelry, or pen or pencil
   c. Putting head down on table
   d. Sitting back in chair away from work
   e. Looking around room
   f. Looks bored
   g. Contributes only when solicited
   h. Writing on paper but not relevant

4. **Off-task aggressive**
   a. Asks purposely disruptive questions
   b. Makes off-task conversation
   c. Announces boredom
   d. Announces refusal to contribute
   e. Makes disruptive noise/laughs/giggles

* (table continues)
Appendix A (continued)

Task Hindering Group Dynamics

5. **Directing/controlling**
   a. Announces rules for the management of member effort
   b. Assigned work/task for other students
   c. Monitored/corrected the non-task conduct of other students (i.e., stop talking/pay attention)
   d. Monitored/corrected the on-task conduct of other students (i.e., your turn/not your turn)
   e. Dismissed/ignored other students' ideas, suggestions
   f. Pull/pushes materials towards or away from other members
   g. Volunteers to read instructions aloud

6. **Resistant aggressive**
   *Comments/complains about functioning of group*
   a. Protests with gestures in response to others' actions
   b. Complains that no one is listening to or paying attention to them
   c. Complains that they are doing their part/others are not
   d. Fighting/bickering over who will do what part of the task
   e. Complains about how the task is being completed
   f. Complains about behavior of another group member

7. **Resistant passive-aggressive**
   *Violations of established group order*
   a. Interrupts other's speech
   b. Announces answers out of turn
   c. Pouts
   d. Speaks loudly to be heard
   e. Leaning across the table, slapping table to be heard
   f. Watches attentively without physically or verbally engaging
   g. Complains about the task

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Task Involvement Communication and Participation

8. **Involved**
   a. Understanding task demands
   b. Being actively engaged
   c. Working cooperatively
   d. Working on task

9. **Communicated effectively**
   a. Listening to others
   b. Keeping eye contact with speakers
   c. Seeking opinions/contributions from others

*(table continues)*
Appendix A (continued)

d. Accepting ideas from others
e. Explaining to others

10. Participated
a. Responding to group needs
b. Working in an organized way
c. Seeking agreement on answers

11. Affect appeared to enjoy/not enjoy the study session
a. Smiled or frowned
b. Expressed enthusiasm/dislike
c. Made positive/negative comments
d. Other

Appendix B
Process Loss Questionnaire Items

1. During the study session, I looked at the experimenter.
2. During the study session, I asked the experimenter if I was doing good work.
3. During the study session, I looked to see if other students were working hard.
4. During the study session, I told my group members how much work I was doing.
5. If someone wasn’t helping during the study session I told him or her that they should.
6. During the study session, I tried to get our group to take turns.
7. During the study session, I told the other members how to help.
8. During the study session, I told other students to stop talking or pay attention.
9. During the study session, I told my group whose turn it was.
10. During the study session, someone was not doing their share of the work.
11. During the study session, someone interrupted me when I was talking.
12. During the study session, someone was not taking turns.
13. During the study session, I had to speak loudly to be heard.

Response format.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

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