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Innovation in Ill-Structured Decision-Making by Teams: Contributions of what members say and don't say and how they are related

ABSTRACT

The contributions of both types of information that are exchanged and coaction in silence to innovation objectives of decision-making teams are considered. Ideation and idea generation are recognized as critical to innovation in decisions that are ill structured. We focus on coaction in silence and the conditions in interaction that are likely to facilitate idea generation. Integration of ideas and evaluations that are likely to contribute most to the quality of decisions are given explicit forms. Major contentions of the account are examined in experimental data.

KEYWORDS: Managerial decision making, Interactive teams, Information exchange, Discrete event Markov

INTRODUCTION

In many well-cited cases, interactive teams have been used as decision-making units in complex objectives that notably include innovation in new product offerings (e.g. Akhavan, Hosseini and Abbasi 2016; Karhu, Ritala and Viola 2016; Schmidt, Montoya-Weiss and Massey 2001). Organizations frequently seek directions for innovation from such teams and commit substantial resources to the directions that can emerge from their decisions. The category of decisions that is most often addressed by such teams has been designated as ill structured (Groenendaal and Helsloot 2016; Simon 1973). Decisions in this category as in new product design and offerings do not typically have algorithmic or even heuristic solution procedures. In contrast, the decisions are outcomes of the information that is exchanged in the team. The discourse to follow will consider processing in information exchange by interactive, decision-making teams and implications for managing the processing to further innovation.

IDEATION AND INNOVATION

We begin by noting that when decisions are ill structured, ideation has been well cited as an initial source of innovation. As will be indicated, the processing in idea generation when individuals are members of interactive teams may not have been adequately elaborated to integrate what have learned from the study of individual processing. We will be addressing this in highlighting the importance of coaction in silence to team objectives in ill-structured decision making. Our interest in the sections to follow will focus upon the proposed relationship of co-acting in silence in a task-directed interactive team to idea generation and the willingness to do so as an intermediary variable of trust. We will give conceptual forms to the relationships that we elaborate and report an empirical operationalization to test key aspects of the relationships.

We also recognize that since all ideation does not contribute to decision quality and innovation, critical evaluation of initiated ideas is essential (e.g. Hao, Ku, Liu, Hu, Bodner, Grabner and Fink 2016). The coordination of these information types has been recognized as important to performance objectives in team decision-making. The path to decisions in such cases is

sometimes structured in sequenced formats. For example, practitioner-oriented accounts (e.g. Dyer and Dyer 2013) have emphasized keeping evaluation separate from ideation in a sequence of stages. The basis for this procedure has been in observations that evaluation generally inhibits idea generation (Toubia 2006). Although sensitivities of the process to conditions that include evaluation have been indicated, questions remain about the capability to exclude evaluation in interactive teams when variables such as interruptions of dialogue by a team member and non-verbal behavior are considered (Silver, Troyer and Cohen 2000). We will propose a basis for alternative procedures to integrate ideation and evaluation for innovation objectives.

Relationships of What is Said and Not Said to Ideation

A number of managerial accounts have emphasized keeping the dialogue flowing in a team (*i.e.,* maintaining continuous information exchange to facilitate ideation). In contrast to these accounts, we will address processing that recognizes the importance of what is not said (here, intervals of silence) and the conditions under which such intervals are likely to occur and can contribute to ideation and ultimate goals of innovation in decisions.

Ideation in Interactive Team Decisions

We begin by reiterating that ideation is essential to innovation in ill-structured decisions and has sensitivities that are only partially understood, as in minimally evaluative conditions. There is also evidence that so-called “incubation” inherently precedes and facilitates ideation and idea generation (e.g., Gilhoaly 2016a and b; Hélie and Sun 2010). While some reports suggest unconscious processing that is unobservable occurs in these periods, there is direct behavioral evidence of idea-facilitating incubation at individual levels (e.g., Dodds, Ward and Smith 2003). How this may occur in interactive teams and what the exact conditions that facilitate it remain to be defined. However, it is clear that incubation typically occurs in intervals of silence. Although all intervals of silence do not indicate incubation, we will suggest that appropriate conditions such periods may well presage incubation and idea generation. While most of the work on incubation that facilitates ideation has been in individuals, we will extend these considerations to the aggregate of a team when intervals of silence are tracked.

Team Coaction in Silence.

Even if incubation implies uninterrupted internal processing that is most likely to occur in teams in periods of silence, co-acting in silence may not be normative in task-directed teams. It could, for example, be considered to reflect “social loafing” (Rutte 2005) or rational agent behavior to avoid negative evaluation of information they initiate, including ideas. To minimize the first of these possibilities in teams, we address teams in which members are committed to team objectives. With respect to the second condition, we will propose a form for a construct of trust in teams that has been extensively cited (Cheung, Gong, Wang, Zhou and Shi 2016; De Jong, Dirks and Gillespie 2016; Golembiewski and McConkie 1975; Porter and Lilly 1996) and suggest conditions on social structure in a team that are likely to facilitate or undermine such trust.

Relationships between perceived equity in the treatment of members in an aggregate and trust and commitment have been recognized (Korsgaard, Schweiger and Sapienza 1995; Wise 2016) and, in turn, related to member satisfaction and team performance (Braun, Peus, Weisweiler and Frey 2013). However, these conceptualizations have not been in terms of the

information exchange of teams. In the present application, trust will be defined as confidence that evaluations will be distributed on a meritorious basis rather than to advance the position or standing individual members in an aggregate social order. As we will indicate, this is most likely to occur in teams in which members are perceived to be status equal and least likely to be assumed in teams in which members are perceived to be status differentiated.

TRUST IN THE INFORMATION EXCHANGE OF A TASK-DIRECTED INTERACTIVE TEAM

Teams like all aggregates of agents tend to have status organizations that operate tacitly whether or not there are "agreements" that members will be considered equal in the interaction. In the information exchange of teams, members acting as agents quickly evidence dual motives. On one hand, they are motivated to contribute to the team's objective and this requires giving and receiving negative evaluations. On the other hand, they recognize that the receipt of negative evaluations can result in status loss and this is typically also an objective.

Given the above, conditions that are likely to best serve the objectives of the teams can be conceptualized as taking the form of trust that risking the initiation of original ideas will only result in objective evaluations, some of which may be negative. However, in teams this is counter to the tendency to over-evaluate lower status members and under-evaluate higher status members in status differentiated teams (e.g. Wittenbaum 1998). Such a tendency can be anticipated to be minimal when members can credibly be considered to approximately be status equals. This can occur through either information on their capabilities on a relevant task or removal of all status related information in computer-mediated communication. To represent this conceptualization of social structure in information exchange, we will propose forms for equity and trust in terms of sources and targets of information as it relates to innovation objectives in ill-structured decisions. For a related discussion see Kulangara, Jackson, Jackson, Prater and Prater (2016)

Dynamics in Team Information Exchange

We next give explicit forms for the foregoing account of ideation as a source of innovation in team information exchange. We first recognize the dual motive problem a member faces.

Given the choice set $\begin{matrix} J \\ N \\ O \\ S \end{matrix}$

Where J is an idea.
N is a negative evaluation.
O is other information types that include positive evaluations (p) and data/facts (o).
S is silence or non-response in a defined interval.

As noted, the dual objectives of committed team members are to maximize quality (as in innovative ideas) in an ill-structured decision and to minimize loss of their own status in social structure of the aggregate. That is, the *jth* agent in an n person team faces the objectives of choosing M in each sequence of information types to max I and min $-\Delta\sigma$ where I is the innovation and σ is relative status.

The individual as an agent further recognizes “costs” to the initiation of information types in terms of their standing in the team’s social order. This standing is most likely to be modified by the receipt of negative evaluation (as weighted by the status distance between the sender and themselves). For this objective, the individual recognizes that

$Pr(N_{kj}|N_{jk}¿ > Pr(N_{kj}|J_{j\Sigma}¿ > N_{kj}|S_{j\Sigma} > Pr(N_{kj}|O_{jk}¿$.

This inequality indicates the inherent tendency when status maintenance is the sole dominant objective to understand negative evaluations and ideas, and avoid coaction in silence in favor of sending positive evaluations and neutral data/facts.

Eq.(1) gives a form to a team’s objective in an ill-structured decision that represents the importance of ideation, conditions on the number of evaluations and the distribution of evaluations across team members. We propose an innovation (or quality) function in three parts. The first is the number of ideas. The second is definable number of negative evaluations to evaluate ideas. The parameter r defines the ratio. (Either too few or too many reduce quality). The third is an equity condition in which the receipt of evaluations by a member is maintained roughly proportional to the number of ideas a member initiates.

The first term recognizes the contribution of ideation to innovation where decisions and problems are ill structured. The second term recognizes that meaningful innovation is increased by a number of evaluations in proportion to the number of ideas initiated since too few or too many can under evaluate ideas and can increase the perceived threat to status by team member.

$$\sum_j J_j^i - \left| \sum_j J_j - r \sum_{k \neq j} N_{kj} \right| - \sum_j \left(\frac{J_j}{\sum_k J_k} - \frac{\sum_{k \neq j} N_{jk}}{\sum_k \sum_{k \neq j} N_{jk}} \right)^2 , t \in (0, t_m)$$

(1) *Q(I)*=

Where J and N are previously defined.

The willingness to weight the team objective greater than the objective in own status can be mediated by a construct of trust that others will do the same. An initial form for such trust can be offered in terms of perceived equity.

$$E_j = c_{n1}\left[\frac{\dot{J}_j}{\sum_k \dot{J}_k} - \frac{\sum_k \Delta_{jk} a_{n2} \dot{N}_{jk}}{\sum_k \sum_l \Delta_{kl} a_{n2} \dot{N}_{kl}} \right] + c_{p1}\left[\frac{\dot{J}_j}{\sum_k \dot{J}_k} - \frac{\sum_k \Delta_{jk} a_{p2} \dot{P}_{jk}}{\sum_k \sum_l \Delta_{kl} a_{p2} \dot{P}_{kl}} \right], c_{n1} >> c_{p1}$$

(2)

where
E_j is the j^{th} member's judgment of inequity in the group. E = 0 indicates perfect equity
i.e. the absence of inequity
J_j is total ideas
N_{jk} is the number of negative evaluations the j^{th} member receives from the k^{th} member a time interval
P is the number of positive evaluations the j^{th} member receives from the k^{th} member in a time interval
Δ_{jk} is the difference in status between the j^{th} and k^{th} member $(\Delta_k - \Delta_j)$
a_{n2}, a_{p2i}, c_n, c_p are rate constants

Trust can, in turn, be defined as

(3) $T_j = \left[1 + E_j\right]^{-1}$, $_j\ T_j \in (0,1)$

Where T_j is an index of the level of trust in the j^{th} member, $T \in (0,1)$

Within this framework, the managerial task can be conceptualized as guiding the exchange of information in an ill-structured decision along a well-defined dynamic path defined by the eqs. (1) to (3) to optimality in decision innovation. The multi-part managerial problem is complex. In this exposition, we will focus upon the issue of coaction in silence and a condition in which trust that facilitates commitment to the team objective can be increased. As indicated, coaction in silence is of particular importance to ideation and innovation if some form of "incubation" is likely to occur in the intervals of silence. Trust and its dependency on perceived equity have been

proposed as a condition for coaction in silence to occur and be a source of greater idea generation.

Equity, in turn, has been related to the distribution of evaluations in a team. The unequal distribution of resources and information that occurs in status-differentiated aggregates has been well documented (e.g. Wittenbaum 1998). We hypothesize that all else equal, achieved equity is more likely to occur in a team in which members are perceived to be status equal than in one in which there is perceived to be status inequality. In support of the foregoing account, we report results of an experimental study of information exchange in task directed groups that operationalizes key variables in our account of indeation and social structure in information exchange.

IDEA-GENERATION TASK

The idea-generation task was an adaptation of the "Winter Survival Exercise" (Johnson and Johnson 2012). This exercise is one of a series in which groups are considered to be alone in hostile environments and must use salvaged items to survive. In an adaptation of this task to the study of idea generation, the group task is to generate as many ideas as possible for survival-related uses of each of several salvaged items. After conducting pretests on eight items, a subtest of five items: six feet of rope, a newspaper, an extra set of clothing, a 45-caliber pistol, and a can of shortening was used in the study. The coefficient alpha for the five items as a composite measure in idea generation in a validation study was .94.

Experimental Facility

. In the face-to-face groups of the first study, members of the four-person groups were randomly assigned seats around a semicircular table designed so that no member was at the head of the seating arrangement. With the consent of participants, a remote wall-mounted video camera recorded all sessions.

Independent Variable: Group Status Distributions

Two group status distributions SD or SU, were created experimentally by the random, non-uniform distribution of a task-relevant status attribute across members. Operationally, this process involved conveying fictitious "survival ability" scores, using a test based on an abbreviated version of the "Desert Survival Exercise" (Johnson and Johnson 2012). This exercise is similar to the "Winter Survival Exercise;" with the location and the survival items modified to a desert setting. The "test" required subjects to rank 10 items according to their importance to survival. Fictitious scores on the "test" were used to define a status hierarchy in the SD condition and a near-equal status distribution in the SU condition.

Members were told their own scores and the distribution of the other three scores in the group, but not the scores of specific individuals. From this information, a member can infer a relative position in the group-a minimum condition for activating a status process. In the SD condition, the distribution of returned scores was 2, 4, 5, 8; 10 was the maximum possible score. In the SU condition, the distribution was 4, 4, 5, 5. Instructions for both conditions emphasized that good ideas come from all members and that group performance is best when all members participate. However, because of its relevance to the group task, the ability attribute remains likely to be activated in the group's status organization when members are differentiated.

Dependent Variables

The numbers of ideas and four other types of information (positive and negative evaluations, data/facts, and questions) and a residual category were calculated from reviews of the videotapes. Ideas were defined as proposed uses of survival items or procedures that directly or indirectly contribute to the group's survival. Positive and negative evaluations were defined as valenced evaluative judgments of the communicated ideas of other group members. Questions were defined as interrogatives that sought information. Data/fact messages were defined as declarative statements about the task.

Coding of Information Sequences

Two coders coded video recordings of the interaction in the sessions for the sequence of information types. Before coding, video recordings were marked at three-minute intervals with a computer-generated tone to allow analyses of the results in consecutive periods.[1] Coders employed a uniform procedure: nine minutes of active coding followed by a two-minute rest period. The more experienced coder scored all records of interaction; to assess reliability, the second coder coded half the groups to estimate reliability. For a sample of 62 three-minute periods, the intraclass correlation between the numbers of ideas coded in the three-minute periods by the two coders was .86. Correlations between coders for data/facts, questions, and negative evaluations were .91, .94, and .82 respectively.

RESULTS

Effects of the Group Status Distribution on Information Exchange

Groups in the SU condition recorded significantly more total uses (*i.e.,* ideas) than groups in the SD condition. (M_{SU} = 110.92, M_{SD} = 89.37, t (19) = 2.4, p< .05). The possibility that groups in the SU condition produced more ideas because they talked more in this condition was also investigated. Only small, non-significant condition differences in total minutes talking (M_{MD} = 25.24, M_{SU} = 26.57, t(19) < 1.0) were found. Means for total ideas adjusted for the covariate of minutes talking continued to show large differences although they became only marginally significant (t (19) = 1.7, p < .10).

Groups in the SU condition exchanged more positive evaluations (M_{SU} = 70.11, M_{SD} = 51.41) and questions (M_{SU} = 24.16, M_{SD} = 21.43), but fewer data/fact messages (M_{SU} = 27.12, M_{SD} = 32.24) and negative evaluations (M_{SU} = 9.31, M_{SD} = 11.12) than groups in the SD conditions. Only the difference in positive evaluations attained significance (t (19) = 2.1, p < .05).

Condition differences in total time interacting were small, and not statistically significant. *(M_{SD}=25.25, M_{SU}=26.57, t (19) <1.0).* Differences in word density were also examined. Repeated-measures ANOVA of time trends in information density (defined as number of words in 18 consecutive two-minute periods) showed no significant main effects of condition, time period, or the interaction of these factors.

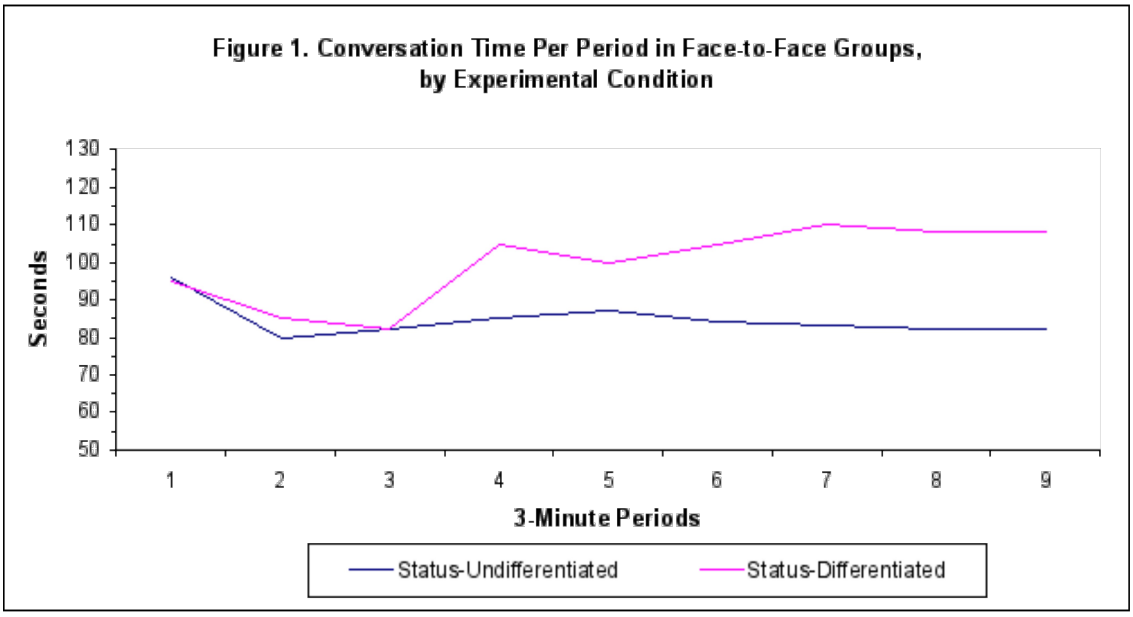
Condition differences in the minutes coacting in silence by conditions were, however, significant *(M_{SD}=14.86, M_{SU}=20.43, t(19) = 2.6, p<.02).* Groups in the *SD* condition spent .37 of their interaction time in silence compared with .45 of this time by groups in the *SU* condition. Across both conditions, a significant correlation between time in silence and number of ideas was indicated *(r= .530, p<.02).* When condition differences in the number of ideas were adjusted for

1 On- and off-times of individual group members by reviewing a video of the interactive group sessions were also coded. In instances of simultaneous talking each of the members received credit for the time in the individual-level analyses.

the covariate of minutes in silence, the differences were no longer statistically significant *(t(19)=<1.0).*
The order of time spent talking in SD groups corresponded to the three status levels. As anticipated, group members designated high-status talked more seconds than those designated as low-status *(*M_{HS}=334.4, M_{MS}=316.6, M_{LS}=278.1). The differences between high and low status members were marginally significant (t(9)=2.71, p<.075) Pairwise contrasts of condition differences in the time talking of middle status members were not significant.

Time Trends in Information Exchange and Coaction in Silence in Group Interaction

In a repeated-measures ANOVA for time spent talking over the first nine three-minute periods (the maximum number of minutes during which all groups continued the task), significant differences in time talking by condition (F(1, 19) = 13.92, p < .00l), a significant overall time trend toward increased talking (F(8, 146) = 3.83, p < .0l), and an interaction of time with condition (F(8, 146) = 4.14, p < .0l) were indicated. Figure 1 presents these results graphically. The figure shows that after the first three periods, groups in the SD condition spent more time talking than groups in the SU condition. Since these groups do not have an interaction history, the initial periods may be used for orientation and organization. Differences increased over time: *i.e.,* as time in interaction increased, SD groups increased their time talking, while SU groups decreased their time talking and increased their time in silence.



Conceptual bases to study condition differences in silence intervals that relate to idea generation have been previously reviewed. The next section will report methodology in analyzing this relationship and the results of the analyses.

Silence as a Discrete Time Event

Data from the 20 groups in the study evidenced an increased time in interaction (M_{SD} =31.14, M_{SU} =29.82 n.s.) and were coded for intervals of silence as discrete events of at least five seconds and the sequence in information exchange that followed these events. Exemplary time sequences in information types and silence intervals for ten groups are shown in Figure 2.

Figure 2. Sequence of Information Types in Ten Groups

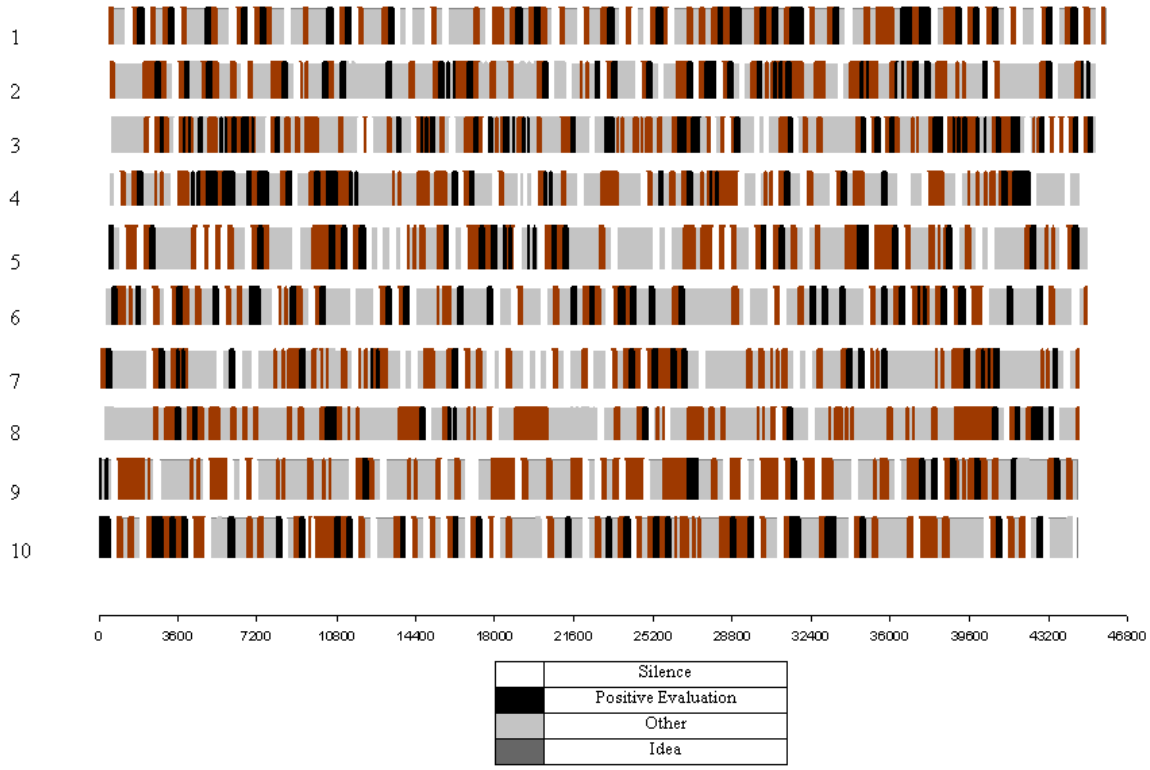


Table 1 reports counts of the information types that followed a silence event for each group. First and second order Markov models were then estimated in the data for the sequencing of information types that followed a silence event for each of the twenty groups in the study. The first order model was found to be a good fit to s→I sequence ($\chi^2(16) = 32, p < .01$) for all but one of the groups. The null could not be rejected for more than five of the second order models, s→I→P and s→I→I and this model was not analyzed further.

Table 1
First Order Markov Model of Information Following a Five Second Silence Interval

		Information Types							
Cond	**Group**	**I**	**P**	**N**	**D/Q**	**O**	**TOTAL**	X^2 **(df=16)**	
SU	1	131	115	5	86	8	345	97.712	
SU	2	86	69	7	30	9	201	45.092	
SU	3	120	74	1	50	7	252	35.041	
SU	4	156	92	9	91	8	356	115.249	
SU	5	67	51	1	41	5	165	70.018	
SU	6	102	88	4	48	5	247	54.410	
SU	7	76	33	18	45	6	178	43.817	
SU	8	148	102	3	35	4	292	63.716	
SU	9	151	47	15	45	4	262	38.170	
SU	10	66	27	8	34	3	138	29.401	
SD	11	66	43	3	21	5	138	42.211	
SD	12	69	55	10	60	8	202	52.581	
SD	13	104	58	11	31	7	211	61.408	
SD	14	112	68	10	50	10	250	69.428	
SD	15	101	48	7	31	6	243	63.731	
SD	16	103	86	13	89	6	297	86.092	
SD	17	66	27	3	43	5	144	39.318	
SD	18	106	42	26	78	5	257	59.771	
SD	19	95	50	12	67	6	224	47.866	
SD	20	68	33	8	20	4	133	37.836	

Ideas were indicated to be most likely to follow a silence event in both conditions but significantly more likely to do so in the SU condition ($t(19)=2.62$, $p<.05$). In contrast, data messages were more likely to follow a silence event in the SD condition than in the SU condition. This difference was marginally significant ($t(19) = 1.7$, $p<.10$). In both conditions, there were significantly more positive evaluations and data messages than ideas. A significant difference between conditions in the type of information that *preceded* a silence event was not found. The discrete event coding was used to calculate *SD* and *SU* differences in the conditional probabilities of information types following a period of silence. These differences are reported in Table 2. In the analysis of groups with zero interaction histories, negative evaluations were infrequent as events following a silence interval and were included in the combined category of other.

Table 2
Conditional Probabilities of Information Types Following a Silence Event

Condition	pr(I|s)	pr(p|s)	pr(F|s)	pr(oth|s)

SD	.463	.009	.172	.365
SU	.590	.021	.104	.285
I = idea; p = positive evaluation; F = data/fact; oth = other type; s = silence				

Results in Table 2 further support the predicted condition differences in the conditional probability of an idea following an interval of silence equal or greater than five seconds. Groups in the SD condition had lower conditional probabilities of initiating an idea following a silence interval than groups in the SU condition. In contrast, groups in the SD condition had high conditional probabilities of initiating facts or other message types than groups in the SU condition.

SUMMARY AND DISCUSSION

The common enfranchisement of teams to make ill-structured decisions in organizations and the contributions that these decisions can make to innovation in cases such as new product offerings has been noted. As recognized, ideation is a critical contributor to innovation in ill-structured decisions. We have proposed that our understanding of processing in ideation of individuals has not been well integrated in the processing of teams and that further integration suggests the increased importance of coaction in silence to team objectives in ill-structured decisions. Evaluations have been recognized as coordinate contributors to innovation since they are essential to filtering ideas on quality criteria. However, the coordination of these information types remains an issue. Influential perspectives have observed that ideation is sensitive to conditions under which it occurs.

Prescriptive accounts that follow from this latter observation have emphasized sequential separation of evaluation from ideation. However, there is evidence that evaluation is common-even if tacit-in interactions that have been defined to be evaluation-free. This has been documenting as occurring through body language including facial expression and intonation, most notably by higher status team members.

We have proposed that rather than proscribing evaluations or requiring that they be deferred, evaluations should be maintained in bounded ratios to idea since too few can under evaluate ideas and too many can establish what we have designated as negative “socio-emotional climates” (Kozlowski, S. W., & Ilgen 2006 ;Pirola-Merlo, Härtel, Mann and Hirst 2002) that can undermine idea generation. Additionally, it is important that evaluations be distributed across members in rough proportion to the number of ideas they generate rather than the status of team members.

To state the focus of the discourse concisely, our attention has been directed to what is not said as well as what is said in the interaction of teams making ill-structured decisions. We recognize a literature that has emphasized the importance of incubation to ideation and more or less solitary conditions under which this typically occurs. We suggest that in teams this commonly implies coaction in silence. For this to occur requires that team members “trust” that doing so does not risk evaluation for “social-loafing” or non-participation. From this perspective, information exchange of teams with greater numbers and more uncommon ideas is likely to include increased silence intervals. A pre-condition of the kind of “trust” that facilitates coaction in silence has been hypothesized to be in the distribution of status in the team that members perceive. Status equal teams are considered to have increased trust in the equitable distribution of evaluations.

The relationships that have been elaborated were given a form in an experimental design to test predictions they offer. A trust condition was approximated by a procedure in which members are given information that indicates they are status equals in task-relevant capabilities. In a contrasting condition that is hypothesized to generate lower “trust”, task relevant information was designed to imply significant inequality in task-relevant capabilities and thereby, status. Groups in both conditions then completed an idea generation task that with their permission was videotaped.

Coding of the tapes designated time intervals of active information exchange and coaction in silence. Analyses showed that although teams in different conditions did not differ significantly in total time interactions, status equal teams spent more time co-acting in silence and generated significantly more ideas than status-unequal teams. The sequencing of intervals of silence and idea initiation was directly examined in Markov models. A first order Markov was found to be a good fit to the model and indicated that ideas predominated in the sequencing of information types following an interval of silence. Calculation of the conditional likelihoods of information type following an interval of silence provided a metric in support of the silence-idea sequence and hypothesized differences between experimental conditions.

Results on the evidenced sensitivity of idea generation to coaction in silence and the interaction of this relationship with the implied status distribution on a task relevant attribute as a hypothesized antecedent of trust support principal contentions of the discourse. In managerial implications, there are that (1) intervals of coaction in silence in conjunction with a now well-cited construct of trust in an information exchange may have not well-recognized relationships to team performance and (2) there are managerial alternatives to the mandate that evaluation be proscribed during idea generation (or entirely).

For (1), the importance of coaction in silence encourages methodology to ensure that member difference in what are perceived to be status characteristics do not result in strong structural distributions in the team and undermine the legitimacy of coaction in silence to team members. In the absence of appropriate conditioning, it is often assumed that “appropriate” work requires maximizing overt dialogue in the team.

For (2), if evaluation occurs and is communicated tacitly, then nominal proscription of this information type will be unlikely to facilitate the team objective. Instead bounding the initiation of negative evaluations a ratio to generated ideas and the condition that distribution across members is closely related to the distribution of idea generation rather than the distribution of status may be better prescriptions for managing possible inhibition of idea generation from excessive or misdirected negative evaluations. GDSSs and IDSSs in computer-mediated information exchange (ref) evidence capabilities to calculate the ratio between information types and the distributions of evaluations across members in real-time. While the managerial task to maintain the maximizing conditions we have proposed are challenging to put in place in face-to-face interaction, computer-based management capabilities to accomplish this are increasingly available. As these capabilities continue to advance, increasing definitive conceptualizations of processing in interactive teams can give direction to design for managing innovation in cases of ill-structured decision-making by teams.

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