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Decision Making By Anesthesiologists During Trauma Treatment: Effects of Stress On Team Interactions

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Of particular interest in settings where skilled individuals function as a team are the relationships between team performance and individual decision-making and how overt behaviors influence one's teammates. Verbal communications among teammates are an important component of effective team performance and can serve to either increase group cohesion or work to its detriment. As part of an investigation of "naturalistic" decision-making under stress, in collaboration with the University of Maryland Anesthesiology Research Laboratory, we analyzed video recordings of trauma teams treating patients upon admission to a Level One trauma center. The effective treatment of acute trauma patients requires the coordinated efforts of a multi-disciplinary team. Decisions are often made under time stress or with some uncertainty about the full extent of the patient's injuries.

The data to be reported here focus on the frequency, content, and patterning of verbal communications among the trauma team as a function of the stressfulness of the treatment situation. We are interested in the extent to which verbal communications reveal the decision making process, as well as how verbal communications reflect differences in performance and decision making under different levels of stress. Altered verbal communications may indicate the nature of the stress or workload being experienced by a team, and may also provide hints about how the more effective teams cope with this stress.

Video recordings have been made of a variety of trauma treatment cases involving patient intubation by anesthesiology teams. These teams typically consisted of one or more anesthesiologists, one or more residents or fellows, and one or more registered nurse/anesthetists. Verbalizations from

the key segments of the video taped cases were transcribed and an attempt was made to identify the speaker of each discernible utterance. A content analysis related these utterances to pre-specified decision trees that conceptualized alternative courses of treatment for various abnormalities in patient vital signs. This analysis allowed judgments to be derived as to the effectiveness of each team's performance.

From review of the video tapes, verbalizations were also categorized and related to the stressfulness of the conditions under which the teams were functioning. Communications were categorized as to requests for information, requests for assistance, directives or instructions, answering questions or requests for assistance, conveying a strategy or plan, providing information unsolicited and non-task relevant utterances. Based on *a priori* notions about what situations would be most stressful, we compared cases involving high and low injury severity, as well as various segments of particular cases, i.e., pre-, post- and during the induction/intubation of the patient. Retrospective subjective ratings of the scenarios along six dimensions of stress/workload confirmed our conjectures about the relative stressfulness of these different situations.

The results indicated that there were systematic differences in verbal communications during periods entailing different levels of stress. During periods when the team functioned under higher stress, verbalizations tended to increase, often occurring simultaneously, and their content became more focused on task-relevant comments, particularly requests for assistance and information. Surprisingly, strategic decisions were not often communicated explicitly. The most effective teams communicated frequently and efficiently with each other. We are exploring the implications of these results for models of team performance and decision making. The results also suggest training strategies for improving communications and team performance in this and related settings.

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