

COMMENTS

On statements made in "Methodological issues in the assessment of sustained performance"

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In their summary paper, Morgan and Pitts (1985) drew conclusions from my work based on a misunderstanding of the procedures employed. They wrote (p. 98) that subjects were tested only at 0430 and 0930 h daily, rather than continuously during the sustained operation, and that much of their awake time was filled with game playing. On page 91, under "Pattern of Activities" (Haslam, 1985b), I stated that

A program of tests and activities was devised to keep the subjects occupied for most of the day, and also the night when necessary. The mornings were taken up with laboratory tests, not all of which are reported here; a full account is given in Haslam (1983d). The afternoons consisted of physical activity, with 1.5 h on the rifle-shooting ranges, and 2 h spent grenade throwing, interspersed with some running. Other tests, mostly sedentary, were carried out for 3 h in the early evening (see Haslam, 1983). Trenches were dug for 3 h prior to midnight, and a 2-h simulated casualty evacuation exercise was carried out from 0530 to 0730 h. When Group B was asleep, Group A undertook the sedentary task of weapon cleaning.

Games are not mentioned, and I can only surmise that Morgan and Pitts were confusing this study with Experiment 2 in my other paper (Haslam, 1985a, pp. 46-54). In that experiment, card games and TV games were played by one group while the other group had their sleep period, because such games are considered to be undemanding sedentary activities. In both studies, apart from the allocated sleep periods, the subjects underwent a program of activities that entailed a combination of continuous physical and mental work (Haslam, 1985a, p. 51).

The conclusion drawn by Morgan and Pitts (1985, p. 98), in reference to my third study, that "More frequent demands for, and assessments of, performance might have resulted in greater sensitivity to the potential effects of sustained operations" is, therefore, totally unjustified. Further, I submit that the program of tests and activities outlined above *does* resemble the performance requirements of "real" combat situations in that activity ceased only when subjects slept.

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A reply to Diana R. Haslam's remarks

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In reference to Haslam's letter of June 13, 1985, my co-author and I would like to apologize if we have misrepresented any of the results of her studies or if we have misunderstood her methodology. It does appear that our observation that "subjects were tested only at 0430 and 0930 h daily, rather than continuously during a sustained operation" (Morgan & Pitts, 1985, p. 98), was inaccurate. We should have said that "cognitive tests were conducted only at 0430 and 0930 h daily during the experimental days and at 0930 h during the baseline and recovery days." It is clear from Haslam's papers (1985a, 1985b) that other tests were conducted at other times; for example, the rifle-firing tests occurred daily at 1230 h.

In addition, our statement that "much of their [the subjects'] awake time was filled with game playing" may have been too strong. Perhaps it would have been more accurate to say that "some of their awake time was filled with nontested activities." Actually, after re-reviewing Haslam's papers, I find that I am unable to determine exactly how much of the subjects' time was spent in "testing" and how much was spent in nonevaluated activities. As I understand them, the measurements reported in Haslam (1985b) represent approximately 1½ h testing (roughly 1 h for the cognitive tests and 30 min for the rifle-firing tests) per day. Details are not provided concerning the total amount of testing time or the amount of time devoted to other scheduled activities.

Perhaps I should also point out that in the prepublication copy of Haslam's APA presentation, she reported that "a program of tests and activities (including card games for relaxation) was devised to keep the subjects occupied for most of the day, and also the night when necessary" (p. 9). As quoted in her letter, a similar statement (without the reference to card games) appeared on page 91 of her 1985b paper. These statements clearly indicate that Haslam's subjects engaged in a variety of "scheduled activities," including periods of nontested activities interspersed between the scheduled testing periods. It is clear (at least to me) that her subjects did not perform the same task (or set of tasks) continuously for any substantial period of time.

Our intention in discussing Haslam's studies was not

to raise questions concerning the validity of any of her findings. Rather, we felt that her studies provided (as do several others) a basis for observing that the results of continuous-work/sustained-operations research may depend in part upon the methodology and performance testing schedule employed in the research. Specifically, methodologies in which performances are measured only once (or even several times) per day are likely not to be as sensitive to the effects of sleep loss and continuous operations as methodologies that measure the same performances more or less continuously throughout a period of sustained operations (such statements have appeared in several previous publications, including Alluisi, Coates, & Morgan, 1977; Morgan, 1974, 1981).

The results of our research, as well as reviews of the literature, indicate that when performances are tested briefly at specified intervals during otherwise continuous activity, subjects may show surprising resistance to the effects of stress. On the other hand, when crews are required to perform the same tasks for long periods of time without sleep, performance decrements are almost certain to occur. In a previous summarization, Alluisi and I noted that

It is reasonable to conclude that performance trends are affected not only by temporal factors, but also by the type of activity during the work period, the nature of the accompanying activities, the measures of performance employed, and the interactions of these with the temporal factors of interest. (Alluisi & Morgan, 1982, p. 231)

In summary, we apologize for any misrepresentation of Haslam's work. However, we feel very strongly about the validity of our general observation of findings from continuous-work/sustained-operations research. We believe that subjects engaged in activities that are "devised to keep the subjects occupied" are likely to perform differently from subjects who perform the same tasks continuously for sustained periods of time. This fact must be considered when the results of different studies are compared.

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A final statement on the methodology

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I wish to thank Morgan for his considerate reply to my communication. I feel it necessary to provide further details of my second paper, in particular the evaluated activities. I provide a timetable, on which are marked the only two unevaluated activities (i.e., preparation of defensive positions and casualty evacuation). Other assessments, such as the vision tests, computer data entry, tracking, and lifting, were carried out by other experimenters under my direction. I consider the data, therefore, to be theirs, and so I did not report them.

Morgan commented on "game playing": card games were played if there was any spare time at the end of mealtimes, and when subjects were waiting to carry out tests. I consider it better for the subjects to be doing something; when they do nothing, they tend to fall asleep.

With regard to the various methodologies in sustained operations research and the question of continuous versus noncontinuous cognitive work, I should like to point out that my subjects were infantrymen, and rank-and-file infantrymen are not called upon to carry out continuous cognitive work. On page 51 (Haslam, 1985), I drew a dis-

Timetable of Activities for Experimental, Baseline, and Recovery Days

| Hours | Activity |
|-----------|----------------------------------------------------------------------------------------------|
| 0830 | Vision tests |
| 0930 | Cognitive tests |
| 1030 | Computer data entry |
| 1130 | Midday meal |
| 1230 | Rifle-firing tests |
| 1415 | Grenade throwing and running |
| 1620 | Evening meal |
| 1700 | Visit tests, computer data-entry, tracking, lifting |
| 2030 | *Preparation of defensive positions |
| 2345 | Light meal |
| 0001-0130 | Group A - 1.5 h sleep on days E1 to E3 |
| 0130-0400 | Group A - military maintenance (weapon-cleaning, hut-cleaning). Days E4 to E6, 0001 to 0400h |
| 0001-0400 | Group B - sleep |
| 0400-0430 | Tea and biscuits |
| 0430 | Cognitive tests |
| 0530-0730 | *'Casualty evacuation' on local training area |
| 0745-0820 | Abutions and breakfast |

Note - The timetable for baseline and recovery days was the same except that sleep was scheduled from midnight to 0715 h. *Not evaluated.