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Time Pressure, Performance, and Awareness of Group Members in Co-acting Groups

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Abstract

Karau and Kelly (1992) propose a resource allocation model of group performance under time pressure. Their model borrows from the attentional focus ideas of Easterbrook (1959), in that it includes attention as a resource, but is more general, in that it includes other resources as well. As time pressure increases, the group allocates more resources to task-relevant activities and pays less attention to lower relevance cues. This would initially improve performance by leading the group to ignore distracters and avoid time-wasting activities, but eventually it would reduce performance as the group narrows its focus of attention too far (causing them to miss task relevant cues) or fails to engage in social activities necessary for group coordination. The current study explores the possibility that this focusing leads group members to lose awareness of each other as time pressure increases, and discusses the implications for group coordination and performance.

Introduction

The modern world is a complex place in which time pressure has become a fact of life. Many of the tasks that must be performed require the processing of enormous amounts of information in very short periods of time. Imagine managing a multinational computer corporation. The decision on the table involves where to build a new factory to produce a new, faster microchip. To make the best decision, the laws of the various candidate nations, market countries, and those of the multinational firm's home office must be taken into account, as well as the nuances of doing business in all those countries. With the accelerated rate of technological development, every day spent making the decision brings the microchip one day closer to obsolescence. No one individual can manage so much information. One common alternative is to use a group of people to perform complex, time-pressured tasks.

For groups to be successful, they must maintain coordination (Steiner, 1972). To do this, group members need to be aware of each other's abilities and distribute responsibilities accordingly (Libby, Trotman, & Zimmer, 1987; Littlepage & Silbiger, 1992). A large body of research exists suggesting that stressors in general lead to a narrowing of attentional focus (Bacon, 1974; Cohen, 1978; Furst & Tennenbaum, 1985), and work in individual decision-making suggests that this effect also occurs with time pressure specifically (Edland & Svenson, 1993; Wright, 1974).

Karau and Kelly (1992) extend these findings to the group level. As time pressure increases, "the group" itself starts to ignore cues that have low relevance to the task and focus its attention on cues with higher task relevance. Similarly, groups engage in fewer social activities and engage in more on-task activities. At first, ignoring low-relevance cues improves performance, as does reducing the amount of social activities. Eventually, the group's focus of attention narrows too far, and it starts to miss relevant cues. Similarly, the group may cease to engage in "social" activities that actually serve group coordination functions. Either way, this over-focusing at high levels of time pressure would hurt performance.

Karau and Kelly (1992) found both an inverted-U pattern of performance and a decrease in social interaction as time pressure increased. However, they manipulated time pressure as time allowed for the task. As the time grows shorter, the task grows inherently more difficult, thus confounding time pressure and difficulty. The extent to which their measure of performance controlled for this is unclear. It is also possible that this performance effect is a result of the aggregation of individuals demonstrating an inverted-U pattern under time pressure.

The social interaction results of Karau and Kelly (1992) suggest two possibilities. First, group members simply have less time to engage in social activity under time pressure but do not lose awareness of each other. The more interesting possibility is that, as time pressure increases, participants lose awareness of their fellow group members. In other words, the typical finding regarding awareness of non-social objects extends to social objects as well. This would be expected if the reduction in group performance at high levels of time pressure really is due to group coordination problems.

Karau and Kelly established that groups under time pressure engage in less social activity. The present study makes no attempt to refute this; its intent is to determine what caused this effect. Specifically, the present study explores the possibility that this effect is symptomatic of a general loss of awareness of other group members.

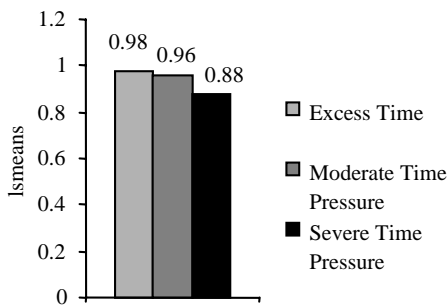


Figure 1a. 1 plus total bias in estimates

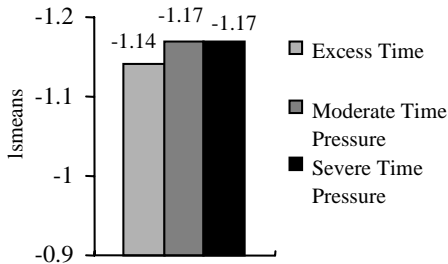


Figure 1b. Natural logarithmic transform of total accuracy of estimate.

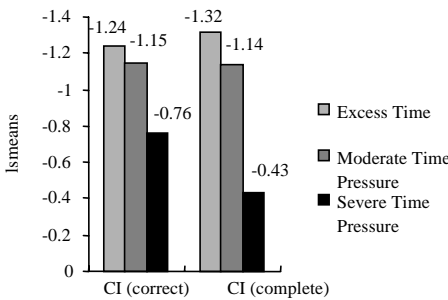


Figure 1c. Natural logarithmic transform of total confidence in estimate

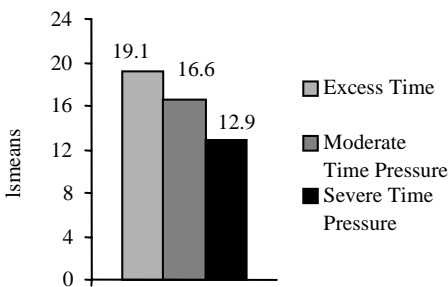


Figure 1d. Total awareness of irrelevant information regarding co-actors

Figure 1. Measures of Awareness by Time Pressure Condition

Axes have been flipped when necessary so that higher bars denote higher levels of awareness.

Procedure

Participants showed up separately and were placed in separate waiting rooms. When all had arrived, they were brought together in 3-person, same-sex groups. Participants then practiced the same anagram-solving task independently but simultaneously with and in the presence of their group members (i.e.- as a co-acting group). The practice session was used as a time-pressure induction period. All participants were given the same amount of time, but different numbers of anagrams. Participants in the Excess Time condition received 75% of the number of anagrams the average participant completed in a pilot study. The Moderate and Severe Time Pressure groups received 100% and 150%, respectively. All members of each group were in the same time pressure condition. Performance was measured as the number of anagrams answered correctly divided by the number possible for that condition.

At the end of practice, participants were given a short questionnaire asking them to provide point estimates for their co-actors' performance. For each point estimate, participants were also asked to provide a range estimate, such that they were 95% certain that the true value of the quantity being estimated was within this range. This questionnaire was used to prime participants to attend to this "task-relevant" information regarding their co-actors.

Participants then completed the main trial under the same conditions as the practice trial. Upon completion, they were asked to estimate their co-actors' performance for the main trial. The first two measures of awareness of task-relevant information, accuracy of estimate and bias of estimate, were computed using the point estimates. Accuracy was defined as the absolute difference between a participant's estimates of his or her co-actors' performance and the co-actors' actual performance. Bias was defined as the signed difference between estimated and actual performance. The third measure of awareness of task-relevant information was confidence in estimate. This was computed as the participant's range estimate divided by his or her point estimate. At this time, participants were asked to fill out a measure of awareness of task-irrelevant information regarding co-actors (physical descriptions), the time pressure manipulation check, and confound checks (difficulty, effort, and desire for social comparison).

Results

There were differences by time pressure condition in difficulty ($F_{2,97} = 6.10, p < .003$) and effort ($F_{2,97} = 17.50, p < .0001$), so all analyses included difficulty and effort as covariates. Even after controlling for these confounds, there were significant differences in perceived time pressure by time pressure condition ($F_{2,95} = 23.74, p < .0001$).

Awareness of task-relevant information did not decrease with time pressure as measured either by accuracy of estimate ($F_{1,84} = 1.07, p > .30$) or bias of estimate ($F_{1,91} = 1.26, p > .27$). Only on the most sensitive measure (confidence in estimate), was there an effect ($F_{1,97} = 10.2, p < .002$). For task-irrelevant information, there was a significant linear decrease in awareness as time pressure increased ($F_{1,79} = 5.30, p < .024$). See figures 1a-d for details.

To control for individual differences in anagram solving ability and/or bias in the performance measure, practice trial performance was used as a covariate in the analysis of performance. There was a significant effect of time pressure on quality of performance ($F_{2,92} = 3.31, p < .041$). Planned contrasts revealed no linear trend ($F_{1,92} = 2.56, p > .113$) but a significant quadratic trend ($F_{1,92} = 4.84, p < .030$). This pattern of findings can only be described as an inverted-U (see figure 2).

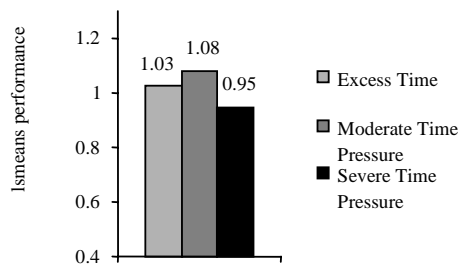


Figure 2. Arcsin Transformation of Proportion Correct by Time Pressure Level

held even after taking into account the effects of difficulty and effort, suggesting that the Karau & Kelly (1992) results were not due to a difficulty confound. However, because there is no interaction in co-acting groups, the present effect cannot be due to difficulties in group coordination or any effect at the group level. There is a body of empirical and theoretical work that would suggest a loss of awareness and coordination would lead to a reduction in group performance. However, future work should examine whether the performance curves of interacting and co-acting groups actually differ to rule out the (relatively uninteresting) possibility that this inverted-U at the group level is merely an effect of aggregating the inverted-U patterns found for individuals.

Discussion

Members lose awareness of each other as time pressure increases, but far less so in terms of task-relevant than task-irrelevant information. This is consistent with a resource allocation model of groups under time pressure. Members stop allocating attention to irrelevant information about each other (such as what each other look like), but allocate a fairly constant amount of attention to the information they were *primed to consider important*. This suggests that time-pressure has a direct effect on awareness of group members in addition to the indirect effect that would be expected with the reduced social interaction observed by Karau and Kelly (1992). This effect could be especially problematic for group coordination if group members do not consider coordination related information to be important.

The expected initial benefit of narrowing of attentional focus and the following detriment at higher levels of narrowing were found. These findings

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