announced as the real outcome and lower ratings for the alternative outcome than subjects in the perseverance condition and in the control group. The perseverance effect was clearly attenuated by information about the definite outcome and a hindsight bias occurred instead. Neither consistent perseverance nor consistent hindsight effect patterns could be determined in the hindsight negation condition, in which the outcome that was explained before was excluded as the "real" one.

Discussion: Results were interpreted as a confirmation of the assumption that the quality of outcome information is a crucial determinant for the occurrence of perseverance or hindsight effects. When certain outcomes have been explained they persevere whenever information about the "real" outcomes does not offer unambiguous judgmental anchors for probability ratings, such as in the perseverance condition and to a somewhat lesser extent also in the hindsight negation condition. On the other hand, if the outcome information provides a clear picture of what really happened, subjects will anchor their probability ratings on this outcome information.

These results have important implications for experiments in which the subjects are given fictitious feedback regarding their own self-concepts (e. g., test performance feedback). In these experiments subjects often show perseverance effects: They incorporate the fictitious feedback in their self-concept even after having been informed about the arbitrariness of the feedback. As our experimental data show, in these conditions it may not be sufficient to stress the fictitious nature of the feedback, but to give information about the real test performance if possible. *The German Journal of Psychology Volume 18 . No 1. March 1994 . p. 33 - 35*

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Introduction: Solving problems associated with computer-simulated reality-oriented systems is a focal point of psychological research. Computer-simulated scenarios are also increasingly used in aptitude testing, although some important questions still have not been answered: the "ecological" validity of the scenarios, the reliability and validity of the problem-solving performance measures and other behavior indicators, the significance of intellectual capabilities, knowledge and non-cognitive factors.

The goal here was to examine the relationship between intelligence and system control performance. Special emphasis was placed on determining the reliability of the problem-solving performance measures, since the predictability of control performance is limited by them.

Proposition: Problems can be divided analytically into their *formal structure,* on the one hand, and their *semantic context,* on the other hand. The formal

structure of a problem determines the intellectual abilities needed to solve it. Work on the formal structure of a problem that consists of controlling a network of variables requires, in particular, two forms of thought processes: *inductive* reasoning, in order to discern rules in a large quantity of available information about a system and to derive hypotheses about the properties of variables and relations; and *deductive* reasoning, in order to check these hypotheses. Deductive reasoning is also necessary to make use of knowledge to derive concrete plans of action from knowledge about relationships between the variables.

In the Berlin model of intelligence structure (hereafter BIS; Jäger, 1984) tasks which require inductive and/or deductive reasoning are characterized as belonging to the operation class "processing capacity" (BIS-C). Therefore, we assume that achievement on intelligence tests predicts achievement on computer-simulated systems. The most important single predictor should be the "processing capacity" scale of the BIS.

On the other hand, the area from which prior knowledge can be activated for the solution of a problem essentially depends on the way the problem is formulated: The semantic context activates the subjects prior knowledge in the domain from which the context is taken.

We consider intelligence, especially the capability to reason inductively and deductively, to be a necessary prerequisite for the acquisition and use of knowledge. A close empirical relationship is, therefore, to be expected between intellectual ability and specific knowledge, if equivalent learning conditions (i. e., occasions and motivation for learning, among other things) can be assumed for the person acquiring this knowledge.

Methods: In one study 214 high school pupils worked on the problem-solving scenario, "tailor-shop," in three sessions, first for 12 and then twice for 6 simulated months, with respectively changed starting values. The system simulates a small shirt factory. It consists of 24 interconnected variables, ten of which can be directly influenced by the subjects. The subjects, playing the role of a manager, were given the explicit goal of maximizing the total capital of the company.

To measure intelligence we used a test for the BIS, and we measured general prior knowledge with a standardized test on business management. System-knowledge and action-related knowledge specific to the task were measured with a content-valid test for the "tailor-shop" before and after the subject's first work session with the system, as well as at the end of the study.

Results: We first applied two traditional criteria of problem-solving performance: the total capital at the end of the work session and the number of months in which a profit was made. The reliability of the performance measures, $r = .37$ to $r = .53$, determined as the intercorrelation over the three work sessions, was not particularly high. Nonetheless, with such rates of reliability, systematic variance can be assumed. The results, however, were definite: The correlation between problem-solving performance and all 8 BIS scales, as well as the correlations with the tests of knowledge, oscillated around zero. At the

same time, the descriptive results proved without a doubt excessive demands had been placed on the subjects. A task analysis of the "tailor-shop" showed that the traditional performance measures were not valid indicators of their ability to manage the system under these conditions.

For this reason, a new problem-solving performance measure composed of two equally weighted partial goals was developed (the number of shirts sold and the profit margin per shirt sold). The reliability estimates for the new performance measure were higher then those for the traditional ones: $r = .52$ to $r = .61$. There was now a significant relationship between the BIS-C scale and the new performance measures with correlations of .43, .25, and .32 from the first to the third trial and $r = .40$ for the aggregate of the three trials. System specific and general prior knowledge correlated significantly with intelligence scales. Despite this fact, both knowledge scales explained significantly incremental variance in problem-solving performance in addition to BIS-C.

Discussion: The results show that differentiated intelligence test results are important, but that they are not the sole significant predictors for system management performance. The significance of prior knowledge specific to relevant areas, in addition to the relatively low reliability of the problem-solving performance measures, limits the expected high correlations between intelligence and problem-solving performance measures.

Furthermore, the study shows that the validity of a problem-solving performance measure depends not only on the system employed, but also on the general conditions of its presentation. The task analysis showed that even indicators that are directly oriented to the goal proposed under the given conditions could not differentiate validly between more or less rational problem-solving behavior. The correctness of this task analysis was confirmed empirically in a follow-up study (Süß, Kersting, & Oberauer, 1991). Therefore, it is reasonable to assume that other published results in which no relation was shown between achievement on the intelligence test and in system management are artifacts of unreliable and/or invalid performance measures.

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