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When job incumbents and laypersons analyze jobs: Does decomposing items and using less complex items make the ratings of both groups more accurate?

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### **Abstract**

Although research has tried to lessen the cognitive burden for job analysts by decomposing the decision process, findings have been ambiguous. This ambiguity may stem from overlooking the idea that analyzing jobs involves intuitive processes that decomposing hinders, at least if the job analysts have much job experience (i.e., job incumbents). Furthermore, job incumbents' intuition might be particularly advantageous if complex items are used. Focusing on the job of paramedics, we found that incumbents' ratings were more accurate than laypersons' ratings if the job was presented holistically, whereas laypersons were more accurate when the job was decomposed. Results also showed an analogous job experience  $\times$  item complexity interaction. These findings indicate that the role of intuition for analyzing jobs deserves more attention.

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Job analysis constitutes the foundation of virtually every human resource initiative – or at least it should! Job analysis – identifying job requirements and determining the relative importance of these requirements – typically results in a job description, which can then be used to classify jobs, (re-)design jobs, detect training needs, develop recruitment plans, refine performance management systems, and for other purposes (e.g., Branick & Levine, 2002). Given their far-reaching consequences, it is essential that job analysis ratings are as accurate (i.e., close to the true value) as possible – in other words, errors should be avoided. Unfortunately, accuracy is not always easy to achieve.

Rating job content and job requirements within job analysis is a complex cognitive process involving considerable rater judgment (Cornelius & Lyness, 1980; Morgeson & Campion, 1997), because job analysts must consider numerous factors before passing judgment on various attributes of a specific job. For example, if job analysts use the Fleishman Job Analysis Survey (F-JAS, Fleishman & Reilly, 1995), one of the most established job analysis instruments (Wilson, 2007), they have to rate 73 abilities that might be necessary for a specific job. These 73 abilities cover a very wide range of domains, ranging from problem sensitivity (i.e., knowing when something goes or could go wrong) to gross body coordination (i.e., the ability to coordinate the movement of the arms, legs, and torso), and sometimes F-JAS items cover several independent aspects in one item. Furthermore, when filling out the F-JAS, job analysts have to keep in mind that the specific job they analyze typically consists of different tasks that require different abilities. Given this repeatedly described complexity (e.g., Morgeson & Campion, 1997; Sanchez & Levine, 1994), job analysis ratings may not be accurate – for example, a job analysis that is conducted as the first step of a personnel selection process may suggest that some abilities

are more (or less) relevant than they really are and thus may reduce the validity of the selection system.

Many studies have shown that cognitively demanding processes, such as analyzing jobs, are prone to error (Driver & Streufert, 1969; Gaugler & Thornton, 1989; G. A. Miller, 1956; J. G. Miller, 1960). Despite the unquestioned importance of the accuracy of job analysis methods and their susceptibility to error, there is only little knowledge about factors that can influence the quality of job analysis methods (Dierdorff & Morgeson, 2007; Morgeson & Campion, 1997; Morgeson, Delaney-Klinger, Mayfield, Ferrara, & Campion, 2004). Most attention has been paid to attempts to minimize the cognitive burden for raters by decomposing the judgment process instead of requiring holistic decisions (Butler & Harvey, 1988; Cornelius & Lyness, 1980; Sanchez & Levine, 1994). However, these studies gave only ambiguous answers about the usefulness of decomposition as an information processing strategy. The goal of this study is therefore to help understand when the kind of information processing (i.e., decomposing the process vs. holistic decisions) is (not) beneficial for the accuracy of the job analysis by taking job experience into account. Furthermore, we want to test whether job experience also interacts with item complexity, because this interaction can be deduced from the same theoretical arguments as the job analysis  $\times$  information processing strategy interaction, as we will explain later. However, we will first explain the role of job experience for analyzing jobs and then the role of information processing strategy.

### **Job experience**

Given the repeatedly mentioned complexity of rating job requirements (see, e.g., Morgeson & Campion, 1997; Sanchez & Levine, 1994), having a large amount of job experience should help in achieving accurate ratings (Morgeson & Campion, 1997). The judgment process in job analysis ratings can be conceptualized as an inferential decision in which raters have to infer

job-relevant requirements and their levels, and each rater brings in his or her own specific background knowledge when making judgments. If job incumbents rate a job, they most likely know many details about the various job requirements and their relevance for that job. However, if raters are job laypersons (i.e., with minimal or no experience with the job that is to be analyzed), they can be expected to be less knowledgeable about the job, and are therefore likely to rely on inadequate or incomplete information which should in turn decrease the accuracy of their judgments. This argument has received support from several studies reporting that job incumbents produced more accurate ratings than job laypersons (i.e., students, see, e.g., Cornelius, DeNisi, & Blencoe, 1984; DeNisi, Cornelius, & Blencoe, 1987; Harvey & Lozada-Larsen, 1988). Accordingly, we hypothesize:

Hypothesis 1: Job incumbents produce more accurate job analysis ratings than job laypersons.

### **Information processing strategy**

To make the judgment process easier, several authors have suggested that raters should use a decomposed information processing strategy instead of a holistic one (e.g., Armstrong, Denniston, & Gordon, 1975; G. A. Miller, 1956; Morera & Budescu, 2001). Decomposition refers to first dividing a complex object into a number of smaller parts, then allowing raters to judge each part, and finally reintegrating the various sub-judgments into a single judgment. In the field of job analysis, an entire job can be decomposed into its parts, usually into its tasks or groups of tasks, and raters can then separately rate the requirements for each task or each group of tasks (e.g., Cornelius & Lyness, 1980; Sanchez & Levine, 1994). For example, the job of a paramedic might be decomposed into tasks such as transfer of patients, crisis intervention, administration, and so on. The alternative information processing strategy is the holistic strategy, in which raters rate the requirements for the whole job at once. Whether job analysts use a

decomposed or a holistic processing strategy may be a personal preference or triggered by presenting a job in a decomposed or a holistic way (e.g., Cornelius & Lyness, 1980; Sanchez & Levine, 1994).

There are two main explanations in the literature as to why a decomposed strategy might lead to more accurate results than a holistic strategy. First, decomposition should reduce judgment complexity and thus the information-processing burden. As there are limits to the human capacity to process information (e.g., Kahneman, Slovic, & Tversky, 1982; G. A. Miller, 1956; J. G. Miller, 1960), it should help raters if the amount of information that has to be considered for a single sub-judgment is smaller than for one overall judgment. Decomposition should therefore minimize the possibility of information overload during the judgment process. Second, decomposition should minimize the probability of using inadequate or incomplete information, either by allowing more differentiated judgments (Ganzach, Kluger, & Klayman, 2000) or by decreasing the tendency to ignore important attributes (Armstrong et al., 1975; Fischer, 1977; Shepard, 1964), or both.

Empirically, the cognitive psychology literature supports the idea that decomposed judgments are more accurate than holistic ones (e.g., Armstrong et al., 1975; Dawes, Faust, & Meehl, 1989; Morera & Budescu, 2001), but results are less clear in the field of job analysis. In both the study by Cornelius and Lyness (1980) and the study by Sanchez and Levine (1994), some evidence favored decomposed judgments, and some favored holistic judgments. A look at the literature reveals that evidence favoring decomposed judgments is always found if students are used as raters, whereas evidence favoring holistic judgments is only found if raters are job incumbents. Thus, it seems that only job incumbents can profit from using a holistic information processing strategy, maybe because holistic processing is closer to job incumbents' typical cognitive processes. This argument fits with what is known about intuitive decision making

(Dane & Pratt, 2007): According to Dane and Pratt (2007), intuition—defined as “judgments that arise through rapid, nonconscious, and holistic associations” (p. 33)—can sometimes lead to better decisions than rational judgment (as used in decomposed decision making). Dane and Pratt argue that intuitive decision making is particularly well suited for the integration of different, highly complex pieces of knowledge into usable categories of information. This argument is supported by a number of studies that demonstrate that experts’ holistic judgments are often highly accurate (e.g., Dreyfus & Dreyfus, 1986; Klein, 2003; Prietula & Simon, 1989; Simon, 1992). This argument also implies that job incumbents, equipped with expertise and their large and highly complex knowledge about their job and its various requirements, should therefore profit from a holistic strategy (triggered by a holistic presentation of the job). On the other hand, job laypersons with no expertise and limited knowledge about the job should profit from a more rational strategy (triggered by a decomposed presentation of the job). These arguments lead to the following hypothesis:

Hypothesis 2: There is an interactive effect of job expertise and information processing on accuracy of job analysis ratings (i.e., job laypersons show more accurate ratings when a job is presented in a decomposed way, whereas job incumbents show more accurate ratings when a job is presented in a holistic way).

### **Item complexity**

If the complexity of the judgment process causes accuracy problems for job analysis ratings, this effect could analogously be shown by comparing more versus less complex items (see also Morgeson et al., 2004). In many job analysis instruments, items differ in the number of aspects that are included, rendering some judgments more complex than others. Such differences in item complexity may be relevant for job laypersons and job incumbents in different ways. Job laypersons may benefit from using less complex items because they cannot rely on holistic

information processing (Dane & Pratt, 2007). If job incumbents are able to make rather intuitive, holistic judgments when they rate their jobs, this advantage may particularly fit with the use of complex items (which require more complex and thus more holistic information processing). We therefore postulate the following hypothesis, similar to Hypothesis 2:

Hypothesis 3: There is an interactive effect of job expertise and item complexity on accuracy of job analysis ratings (i.e., job laypersons show more accurate ratings when using less complex job analysis items, whereas job incumbents show more accurate ratings when using more complex job analysis items).

## **Methods**

### **Contextual information about (Swiss) paramedics**

Paramedics are health professionals who provide emergency medical services, often in ambulances. They are trained to assess patients' conditions; the specific treatments they are allowed to apply usually depend on national law. In the town in Switzerland where we collected our data, a three year vocational college education is mandatory to become a paramedic. Similar to paramedics in many countries, they mainly use non-invasive techniques, but Swiss paramedics are allowed to use certain invasive techniques as well when necessary and are permitted to administer analgesics. Beyond providing pre-hospital care, paramedics are also responsible for performing maintenance measures for the ambulances, cleaning and disinfection of apparatuses and instruments, managing the pre-hospital care infrastructure, writing operational reports, and doing other administrative duties.

### **Participants**

Two groups of participants answered the job analysis questionnaire: job incumbents and job laypersons. The job incumbents group consisted of 44 paramedics in a Swiss city who participated in the study during a training course, with 30% of the paramedics being female and



70% male. The paramedics took part in the study as part of a continuing education course. Their average age was 34.9 years ( $SD = 6.94$ ) and the average amount of job experience was 9.7 years ( $SD = 7.11$ ). The job laypersons group consisted of 44 psychology students<sup>1</sup> from the same town with no medical background. Of these, 25% were male and 75% female. The average age was 24.8 years ( $SD = 7.32$ ), and they received credit as part of their general research subject requirements for their participation.

### **Job analysis instrument**

The German version of the F-JAS (Kleinmann, Manzey, Schumacher, & Fleishman, 2010) was used. The F-JAS is the result of a long research program that focused on the identification of abilities necessary for performance (e.g., Fleishman, Costanza, & Marshall-Mies, 1999; Fleishman & Mumford, 1991; Fleishman & Quaintance, 1984). The F-JAS consists of a series of 73 rating scales, covering a comprehensive range of abilities: 21 cognitive abilities, 10 psychomotor abilities, 9 physical abilities, 12 sensory/perceptual abilities, and 21 social/interpersonal abilities. Each rating scale includes a construct definition, information on how each ability is distinct from other abilities, and examples of job tasks that require different levels of that ability (i.e., its scales are behaviorally anchored, for examples see Buffardi, Fleishman, Morath, & McCarthy, 2000, or Schumacher, Kleinmann, & Melchers, 2011). Each ability is rated on a scale from 1 to 7.

The F-JAS has been described as one of most thoroughly developed job analysis instruments (Wilson, 2007). Its reliability has been established in many studies (see, e.g., the review by Buffardi et al., 2000) and there is also much evidence for its construct and predictive validity (Fleishman & Mumford, 1991; Kleinmann et al., 2010). The taxonomy established by the F-JAS is also the basis for the Occupational Information Network (O\*NET, see Fleishman et al., 1999). The F-JAS uses terms that are concerned with worker requirements and can thus be

classified as worker-oriented job analysis instrument (the other category being job-oriented job analysis instruments where the terms focus on work tasks and procedures, see, e.g., Morgeson & Campion, 1997).

Besides these general reasons for using the F-JAS, this instrument was particularly suitable for this research project for two reasons: (a) According to Morgeson and Campion (1997), limitations in information-processing systems are likely to result in inaccuracy for all job analysis instruments, but the effects are expected to be stronger for worker-oriented instruments (such as the F-JAS) because they contain more abstract kinds of information, and (b) The items of the F-JAS range in complexity, which is a necessary precondition for testing Hypothesis 3.

### **Item complexity**

In cognitive psychology, complexity is often operationalized by varying the number of attributes that must be considered or the number of judgments that must be made simultaneously (Morera & Budescu, 2001), and F-JAS items vary in the number of attributes which have to be taken into consideration. For example, when job analysts rate the ability *reaction time* (i.e., the ability to give one fast response to one signal when it appears), they have to consider only one attribute (i.e., speed), whereas the ability *rate control* (i.e., the ability to adjust an equipment control in response to changes in the speed and/or direction of a continuously moving object or scene) is more complex because raters have to consider several attributes (i.e., speed, predictability and direction, see Table 1).

To determine the complexity of the single F-JAS items, we asked three advanced students, who were majoring in work and organizational psychology and had previously worked with the F-JAS, to count the number of attributes that have to be taken into consideration for all 73 F-JAS items. Because their data converged (average  $r_{WG} = .90$ ), we averaged their counts and used these data to calculate a rank order for all 73 items. For the high complexity condition, we

selected the following four items that the ranking revealed as the most complex ones: oral comprehension, speed of closure, flexibility of closure, and rate control. For the low complexity condition, the ranking revealed seven items that shared the same lowest ranking place, making it impossible to decide which four items we should choose for this condition. In order to choose four out of these seven items, we asked six undergraduate students with no experience with the F-JAS to rate the complexity of these items (with a one-item scale: "To be able to precisely assess the abilities, I must take in and retain a lot of information"). These ratings resulted in the following four items: spatial orientation, far vision, near vision, and reaction time.

**Dependent variable: Accuracy**

Accuracy, the dependent variable, was the city-block distance between each participant's profile (i.e., their F-JAS ratings, see below) and expert raters' consensus rating profile (see, e.g., Sanchez & Levine, 1994), with the city-block distance being computed as the sum of absolute differences along each dimension. To ease understanding of our accuracy measure, we recoded it by subtracting the city-block distance from 7. The expert consensus ratings were obtained from seven paramedic experts (six male and one female), who were paramedic supervisors, long-time job incumbents, and trainers, designated by their organizations as particularly experienced and knowledgeable about the job and who met for a full-day workshop.

**Workshop description.** The seven experts first discussed and defined the components of the job of a paramedic and the tasks of the job. This discussion was based on existing job descriptions of paramedics working for different Swiss agencies, and a trainer encouraged the experts to critically examine these job descriptions for whether they really covered all job aspects and to divide all aspects further whenever they considered this important for describing the job of paramedics in this particular Swiss town. (This was done to enhance the likelihood that the experts remembered all relevant job aspects and thus that all aspects were integrated in the

judgment process later on.) All of this information was then used by the experts to decompose the job into 11 job components (transfers to intensive care unit; transfers to trauma room; normal secondary transports; moving of patients / repatriations (at home and abroad); crisis intervention; patient transfer; major incidents / events; administration/documentation; provision of deployment material; supervision and training of trainees and apprentices; further education). The trainer also asked the experts to come up with a list of sub-tasks for all 11 job components to ensure that the components did not overlap: Experts had to agree on which job component included which sub-task. If they could not agree, the trainer asked them to re-consider whether the types of job components were adequate.

After decomposing the job, the experts individually assessed the job as a whole with respect to each ability, using the F-JAS. After that, the experts built a consensus rating for every single scale with the help of a moderator. Furthermore, the experts wrote a job description, which was then distributed among all study participants to ensure a common understanding of what a paramedic does.

### **Procedure and information presentation manipulation**

Job incumbents and job laypersons were randomly assigned to one of two conditions: the holistic or the decomposed presentation condition (with an  $n$  of 22 in each of the four groups). All participants received a short introduction in the first 10 minutes on what the general goal of job analysis is and what the structure of the F-JAS is. They then received the F-JAS questionnaire, a job description written by the paramedic experts (see above), and a separate answer sheet. In the holistic condition, they had to give one overall rating for each of the eight abilities (four highly complex and four less complex abilities, see above). In the decomposed condition, the job was split into the 11 job components (based on the expert ratings, see above). Participants separately rated each of the eight abilities for all 11 job components. To combine the

ratings for each ability from the individual job components, we used the algorithm proposed by Cornelius and Lyness (1980): For each participant and each ability, we averaged the three components with the highest ratings. This was repeated for all eight abilities and all participants. This algorithm fits well with the F-JAS because the F-JAS asks raters for their judgment regarding what level of an ability is required to do the job, and a job incumbent should therefore be able to satisfy all ability requirements for all job components, including the most demanding (Fleishman & Reilly, 1995; Kleinmann et al., 2010).

### Results

Table 2 gives an overview of means and standard deviations for each group and condition. We calculated a mixed  $2 \times 2 \times 2$  ANOVA with the between-subject factors job experience (job incumbents vs. job laypersons) and information presentation (holistic vs. decomposed) and the within-subject factor item complexity (more vs. less complex). Table 3 reports the results of this ANOVA.

As Table 3 shows, there is no main effect of job experience (overall  $M_{\text{job incumbents}} = 2.86$ ; overall  $M_{\text{job laypersons}} = 2.86$ ), thus contradicting<sup>2</sup> Hypothesis 1, no main effect of information presentation (overall  $M_{\text{holistic}} = 3.03$ ; overall  $M_{\text{decomposed}} = 2.68$ ), and no main effect of item complexity (overall  $M_{\text{more complex}} = 2.97$ ; overall  $M_{\text{less complex}} = 2.75$ ). However, we did find a significant interaction between job knowledge and information presentation. As Figure 1 illustrates, job incumbents rated the job requirement more accurately in the holistic condition than in the decomposed condition, whereas job laypersons' ratings were more accurate in the decomposed condition than in the holistic condition, a disordinal interaction effect that supports Hypothesis 2. We also found a significant interaction between item complexity and job experience. As Figure 2 shows, job incumbents rated more complex items more accurately than less complex items, whereas job laypersons were more accurate when rating less complex items

than when rating more complex items, a disordinal interaction effect that supports Hypothesis 3. Furthermore, Table 3 also shows that there was no significant interaction between information presentation and item complexity.

### **Discussion**

Our study contributes to the job analysis literature by highlighting the importance of the interaction between job experience and information presentation (i.e., presenting the job in a holistic vs. a decomposed way) and the interaction between job experience and item complexity. Thus, paying attention to interactions seems to be crucial in order to achieve a better understanding of the effect of cognitive sources of inaccuracy.

More precisely, we found that the ratings of job incumbents were more accurate than the ratings of job laypersons when the job of a paramedic was presented holistically, whereas job laypersons were more accurate than job incumbents when the job was decomposed into 11 job components. This finding is consistent with the idea that only job laypersons benefit from the reduced probability of information overload or the use of inadequate or incomplete information (e.g., Ganzach et al., 2000; Shepard, 1964), whereas experts' holistic and intuitive decision making is inhibited by imposing a certain structure (i.e., the 11 job components) on them (Dane & Pratt, 2007). In other words, decomposition may prevent experts from using their intuitive decision strategies, which would otherwise have been fairly accurate (see also Dreyfus & Dreyfus, 1986; Klein, 2003).

This intuition-based explanation is further supported by the finding of a significant interaction between job experience and item complexity: Job laypersons had more problems with rating more complex items than with rating less complex items, whereas job incumbents had fewer problems with rating more complex items than with rating less complex items. This was expected because job incumbents' holistic information processing should fit better with more

complex items (requiring more holistic thinking) than with less complex items. Thus, item complexity and the way a job is presented seem to have the same divergent effect on job incumbents versus job laypersons.

More generally, these findings suggest that the role of intuition should not be overlooked when analyzing jobs. Interventions that work with inexperienced raters may not work with experts, because experts may rely heavily on their intuition, and this may not be such a bad thing after all (Dane & Pratt, 2007). Given that analyzing a job is generally acknowledged as a complex task (Cornelius & Lyness, 1980; Morgeson & Campion, 1997), the use of intuition for job analysis deserves more attention in the future.

We were unable to find significant main effects for job experience, for information presentation, or for complexity. The absence of a main effect of information presentation is in line with earlier studies, which provided rather inconsistent or unclear results (e.g., Cornelius & Lyness, 1980; Sanchez & Levine, 1994), and is thus not surprising. A primary reason for this finding may lie in the aforementioned interaction of information presentation with additional variables such as job experience, which influence the strength and direction of the effect. In addition, the importance of interactive effects may also be a reason why we were unable to find an overall effect for job complexity. More surprising is the absence of a main effect of job experience, especially given the fact that we used students as a rather extreme group. A possible reason for this finding might be the above-described low accuracy in the decomposed condition for job incumbents (and the less complex condition). It is possible that the decomposed condition (and the less complex condition) forces raters to consider the wrong pieces of information or too much information. Alternatively, they may access the right pieces of information but weigh them incorrectly.

Four limitations should be mentioned. First, we used the F-JAS (Fleishman & Reilly, 1995; Kleinmann et al., 2010), a well-established job analysis instrument focusing on abilities. As noted above, abilities are rather low in specificity and observability. Dierdorff and Morgeson (2009) showed that different descriptor types (e.g., tasks, knowledge, abilities, etc.) can have different influences on job analysis ratings. Hence, we do not know whether it is possible to generalize our results to other descriptor types. Second, we used experts' consensus ratings as our comparison values (following examples like Sanchez & Levine, 1994), and although these ratings have been defended (e.g., Harvey & Wilson, 2000), they are likely not error-free. Third, our raters focused only on the job of Swiss paramedics in a particular town. Given that job analysis ratings can also be influenced by the job rated (e.g., Sanchez & Levine, 1994), we do not know to what extent our results can be generalized to other jobs. Thus, we would particularly welcome a replication study with another occupation. Fourth, our raters were all fairly highly educated, and the education of raters is also known to affect job analysis ratings (e.g., Cornelius & Lyness, 1980). Thus, further research is required to test whether the same results can also be found with less educated raters.

Future research could also explore whether other strategies aiming to improve job analysis ratings have differential effects on job incumbents vs. job laypersons. For example, Morgeson and Campion (1997) made several suggestions for reducing carelessness, but what some consider careless rating behavior may be actually intuition-led (Dane & Pratt, 2007).

Our findings also have implications for the practice of job analysis. In particular, they suggest that the choice of the job analysis decision strategy and the rater group should probably not be considered independently of each other. Job incumbents continue to be an important source of job analysis information, because they are accessible and cost effective and they are directly exposed to the job itself (Dierdorff & Morgeson, 2009). In addition, the job incumbents'



ratings have a high face validity and acceptability among the end users of work-analytic data (Sanchez, 2000). However, in the job analysis literature, the selection of job incumbents is not without controversy (e.g., Sanchez, 2000). If our findings can be replicated, it may be advisable to select more complex and holistic job analysis instruments if job incumbents are chosen for job analysis ratings. This finding is especially important due to the trend in the last few years towards broader and more complex requirements such as competencies (Dierdorff & Morgeson, 2009; Lievens, Sanchez, & De Corte, 2004; Schippmann et al., 2000).

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Footnotes

<sup>1</sup> The advantage of using students is that their restricted knowledge about a job allows for a particularly powerful comparison between job incumbents and job laypersons.

<sup>2</sup> We conducted a sensitivity analysis (which allows testing which minimal effect size could be detected), using G\*Power 3.1.2, Faul, Erdfelder, Buchner, & Lang, 2009, and assuming an alpha of .05 and a beta of .20. G\*Power's answer was a *d*-value of .27 or higher, showing that our sample size was large enough to detect even pretty small effects (e.g., .27).

Table 1

*Examples of Two Abilities Varying in Complexity*

Ability	Complexity	F-JAS definition if a low level of the ability is required for a job	F-JAS definition if a high level of the ability is required for a job
Reaction time	Less	Requires <b>some quickness</b> starting the movement when a signal appears	Requires <b>extreme quickness</b> starting the movement when a signal appears
Rate control	More	Requires <b>timed motor</b> adjustments to a <b>slow-moving, almost predictable</b> object moving in a <b>single direction</b>	Requires <b>precisely timed, fine motor</b> adjustments to <b>random changes</b> of a <b>high-speed</b> object moving in <b>several directions</b>

*Note.* Attributes that have to be taken into consideration to rate an ability are printed in bold.



Table 2

*Means and Standard Deviations for All Conditions*

		Information presentation			
		Holistic		Decomposed	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Job incumbents (n = 44)	More complex items	3.73	1.75	2.85	1.63
	Less complex items	3.14	2.42	1.73	3.25
Job laypersons (n = 44)	More complex items	2.41	2.59	2.87	1.40
	Less complex items	2.86	2.62	3.29	1.47

*Note.* Dependent variable = accuracy.

Table 3

*Results of Analyses of Variance*

Source	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Between subjects				
Job experience (JE)	1	0.00	0.00	0.00
Information presentation (IP)	1	5.36	5.36	0.82
JE × IP	1	27.60	27.60	4.21*
Error 1	84	551.37	6.56	
Within subjects				
Item type (IT)	1	1.99	1.99	0.58
IT × JE	1	18.40	18.40	5.39*
IT × IP	1	0.92	0.92	0.27
Error 2	84	286.74	3.41	

*Note.* Dependent variable = accuracy.

\* $p < .05$ .

Figure 1. Graphical illustration of the interaction between job experience and information presentation (please note that the depicted means are averaged over both complexity conditions).



Figure 2. Graphical illustration of the interaction between job experience and item complexity (please note that the depicted means are averaged over both information processing conditions).

