

JOB REQUIREMENTS FOR FUTURE TRAIN DRIVERS: A JOB ANALYSIS

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Fig. 1 Remote train operator monitoring a train from a control center. Source: DLR

Introduction

Technological changes enable higher automation in the transport sector. Thus, job environments for train drivers will change. Job holders will potentially operate trains from a control center, monitoring multiple trains simultaneously during routine operations. Additionally, they might remotely intervene in particular train rides if necessary. This study aims at identifying the requirements of remote train operators (TO) for automated trains.

Moreover, these TO job requirements were compared with the prospective job requirements of future high-speed train drivers (HS), operating passenger trains with automated speed control on high-speed lines up to 400kmh. Job requirements for HS had already been identified by use of the same method in an earlier study by Brandenburger et al. (2017).

Method

Samples:

Remote train operators (TO)

- N=36 train drivers (experts)
- Age: M=40.3 yrs.
- Experience: M=13.7 yrs. of service
- Gender: male=36

Future high speed train drivers (HS)

- N=21 train drivers (experts)
- Age: M=42.6 yrs.
- Experience: M=22.4 yrs. of service
- Gender: female=3, male=18

Tasks for the subjects:

- Rate job requirements from the perspective of TO and HS, respectively
- Immerging into future job activities by a written job description (HS & TO) and two videos describing future tasks (TO)

Measures:

- F-JAS (Kleinmann et al., 2010) including 75 abilities belonging to five domains
- Abilities with a mean higher than 4 are categorized as “important” for the job

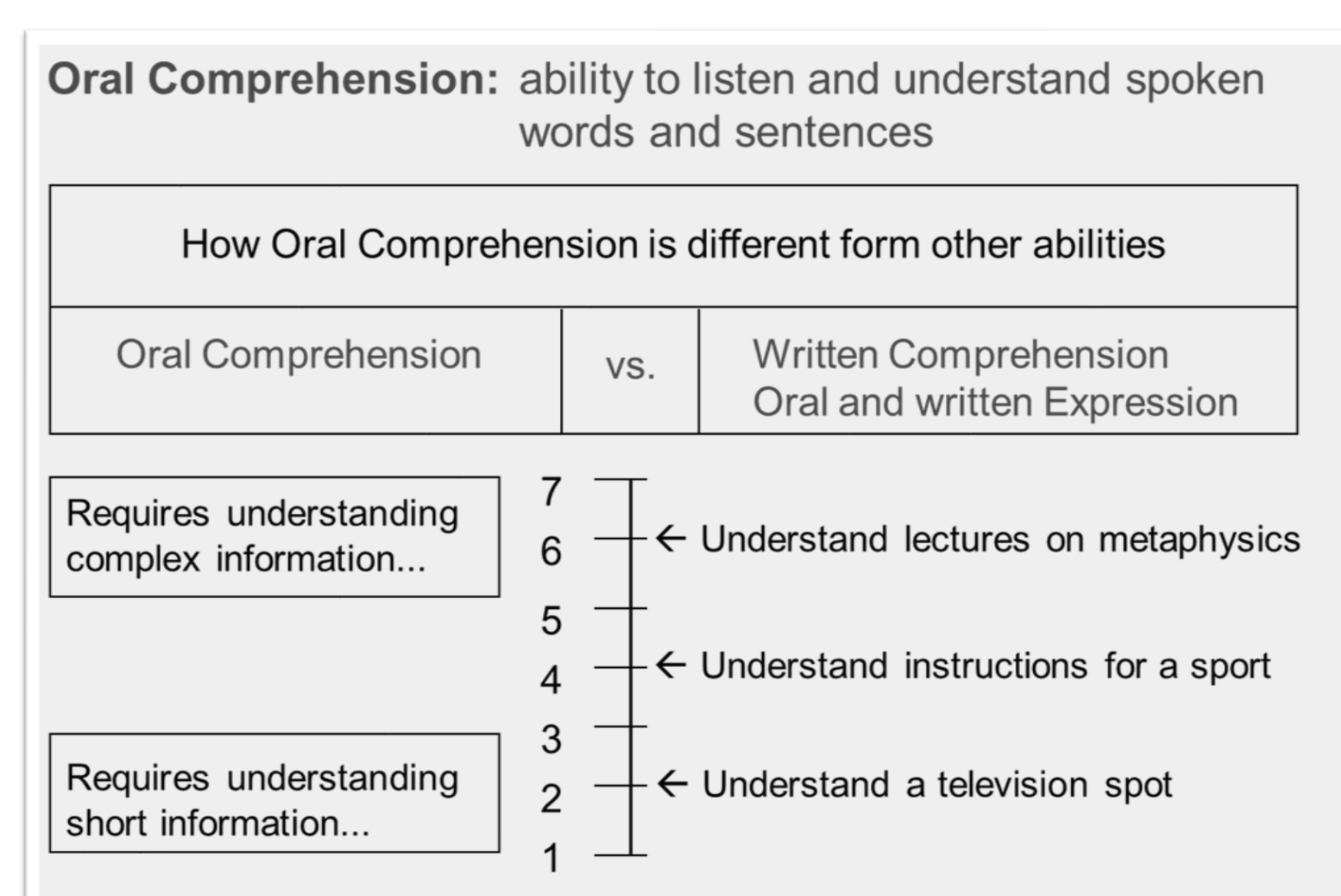


Fig. 2 Example Fleishman Job Analysis Survey (F-JAS)

Results

- Highest rated abilities for TO and HS in the domains of sensory/ perceptual, cognitive and interactive/ social abilities
- Psychomotor abilities were rated lower than sensory/ perceptual, cognitive and interactive/ social abilities, but still important – especially for HS
- No significant differences between HS and TO concerning the four domains named above

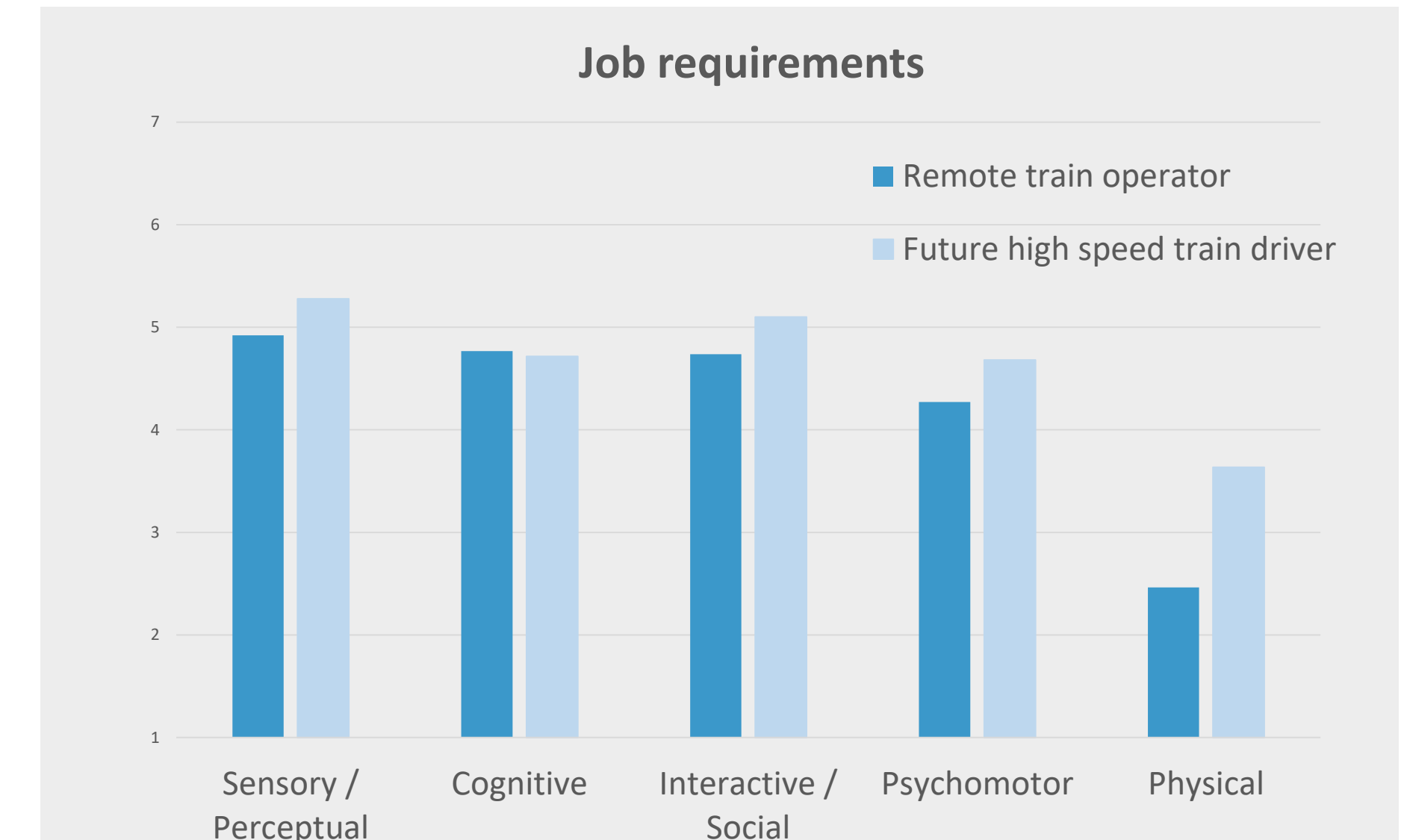


Fig. 3 Requirements aggregated to domains

- Physical abilities showed a significant difference between TO and HS. Nevertheless, they were rated as unimportant for both future job activities (with a mean lower than four)
- Top 10 requirements of TO belong mostly to the cognitive and interactive/social domain
- The ranking for HS is similar but shows slight differences

Tab. 1 Top 10 requirements remote train operator

Requirements	Domain	Mean TO	Mean HS
1. Dependability	Interactive	6,47	6,43
2. Operational monitoring	Cognitive	6,31	5,73
3. Vigilance	Cognitive	6,08	--
4. Emotional control	Interactive	5,94	5,76
4. Perseverance	Interactive	5,94	5,86
6. Time sharing	Cognitive	5,86	5,33
7. Reaction time	Psychomotor	5,72	5,57
8. Perceptual speed	Cognitive	5,64	5,43
9. Selective attention	Cognitive	5,61	5,48
9. Spatial orientation	Cognitive	5,61	4,90

Conclusion

Future remote train operators need to be dependable, good in operational monitoring and vigilant.

Essentially, job profiles for TO and HS have the same requirements. Physical abilities are rated lower for TO, but they are not important for both job profiles. Practically, that underlines that the job of future TOs could be designed as a completely accessible workspace.

References

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- Kleinmann M., Manzey D., Schumacher S. & Fleishmann, E. A. (2010). *Fleishman Job Analyse System für eigenschaftsbezogene Anforderungsanalysen (F-JAS). German Version of Fleishman Job Analysis Survey by Edwin A. Fleishman.* Göttingen: Hogrefe Verlag GmbH & Co. KG.