

APPENDIX D

ALTERNATIVE SUBJECTIVE WORKLOAD ASSESSMENT TOOLS:

Modified Cooper Harper (MCH) Scale

Task Load Index (TLX)

Subjective Workload Assessment Technology (SWAT)

Operator Workload (OW) Scale

D-1

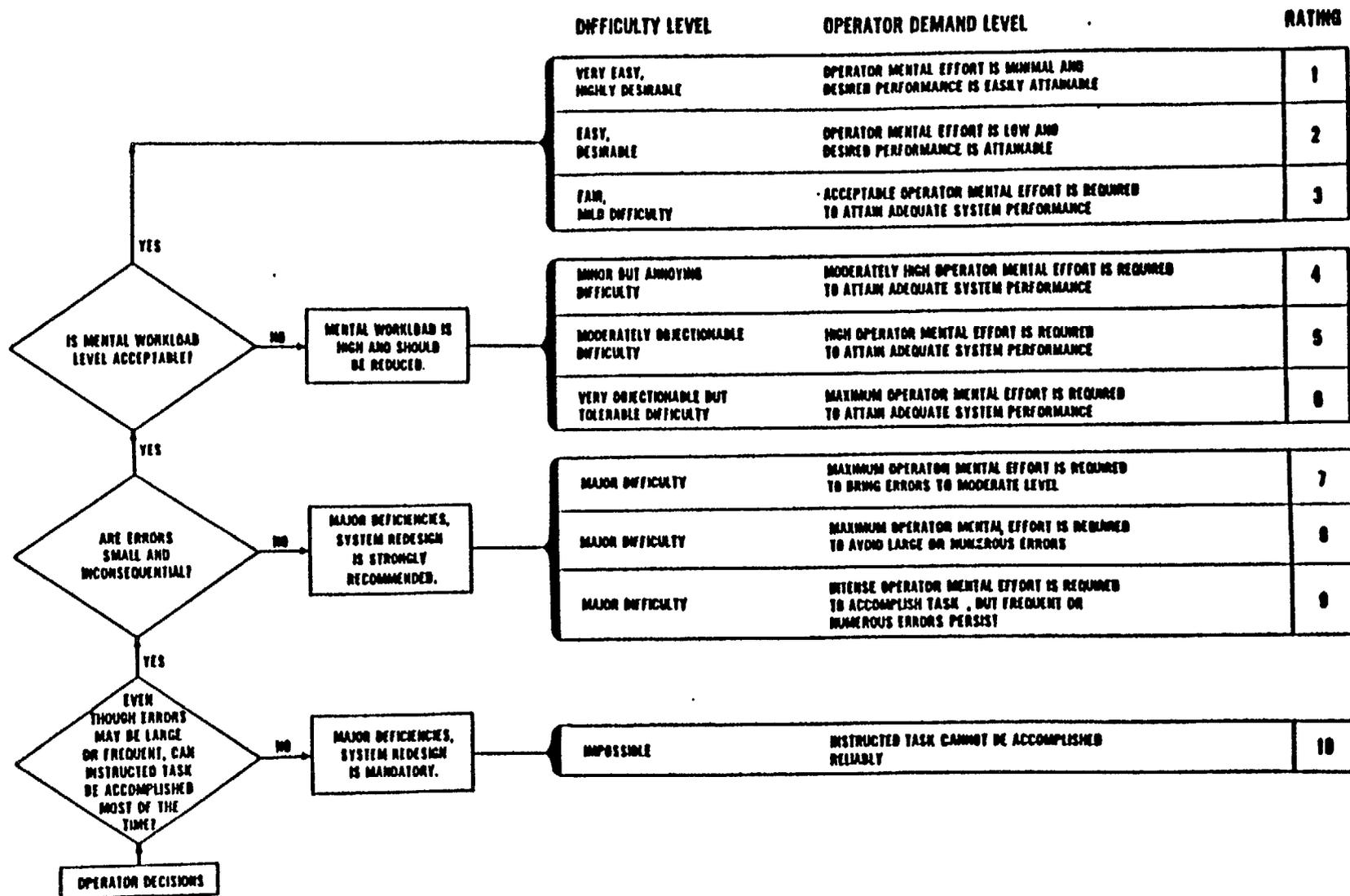


Figure D-1. The Modified Cooper Harper (MCH) Scale¹

Task or Mission Segment: _____

Please rate the task or mission segment by putting a mark on each of the six scales at the point which matches your experience.

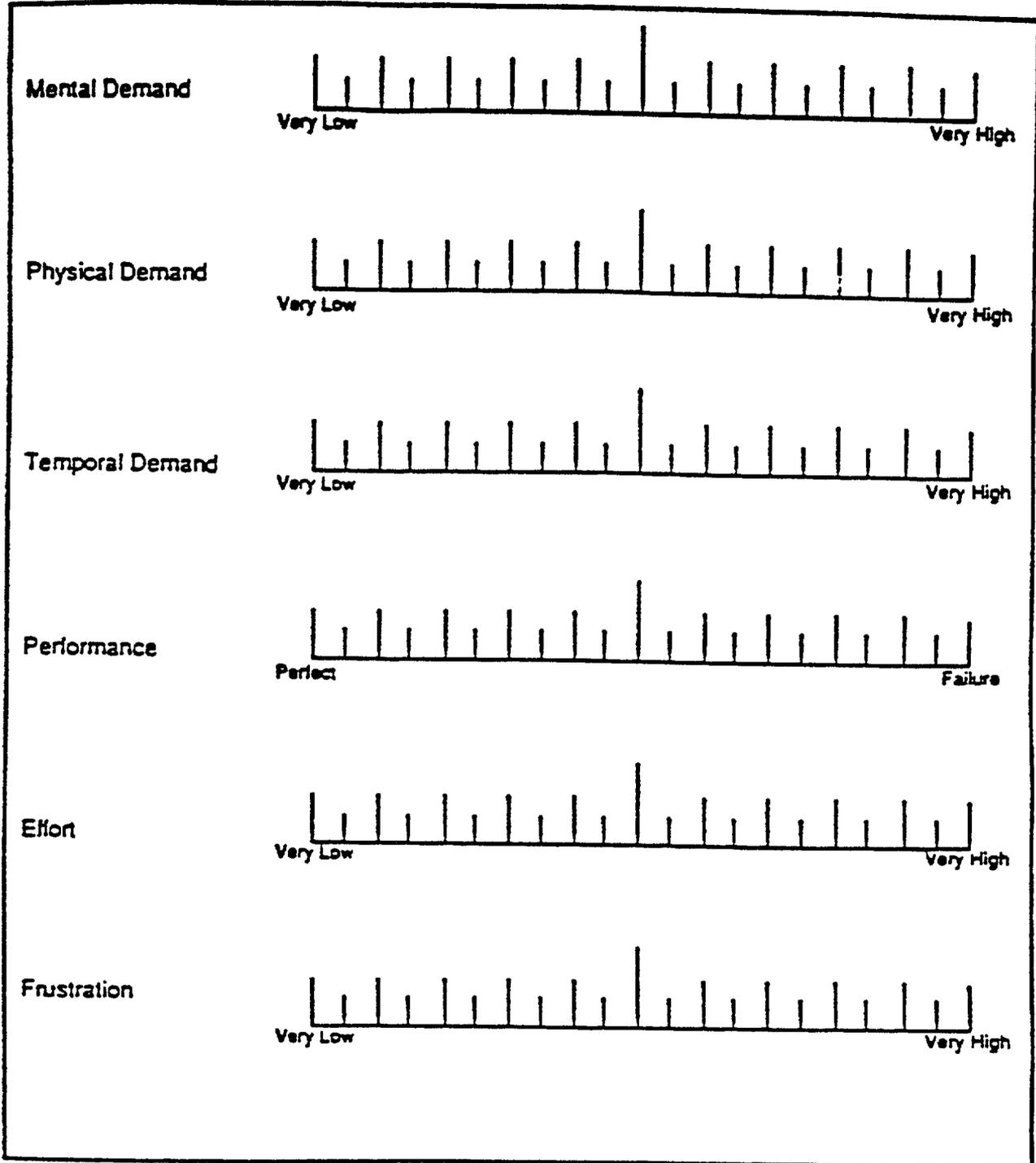


Figure D-2. The TLX Scale²

NASA TLX Scale: Rating scale definitions		
Title	Endpoints	Descriptions
MENTAL DEMAND	<i>Low/High</i>	How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?
PHYSICAL DEMAND	<i>Low/High</i>	How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?
TEMPORAL DEMAND	<i>Low/High</i>	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?
PERFORMANCE	<i>Perfect/Failure</i>	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?
EFFORT	<i>Low/High</i>	How hard did you have to work (mentally and physically) to accomplish your level of performance?
FRUSTRATION LEVEL	<i>Low/High</i>	How insecure, discouraged, irritated, stressed, and annoyed versus secure, gratified, content, relaxed, and complacent did you feel during the task?

Figure D-3. TLX Definitions³

SWAT Scale		
Time load	Mental effort load	Stress load
1. Often have spare time. Interruptions or overlap among activities occur infrequently or not at all.	1. Very little conscious mental effort or concentration required. Activity is almost automatic, requiring little or no attention.	1. Little confusion, risk, frustration, or anxiety exists and can be easily accommodated.
2. Occasionally have spare time. Interruptions or overlap among activities occur frequently.	2. Moderate conscious mental effort or concentration required. Complexity of activity is moderately high due to uncertainty, unpredictability, or unfamiliarity. Considerable attention required.	2. Moderate stress due to confusion, frustration, or anxiety noticeably adds to workload. Significant compensation is required to maintain adequate performance.
3. Almost never have spare time. Interruptions or overlap among activities are very frequent, or occur all the time.	3. Extensive mental effort and concentration are necessary. Very complex activity requiring total attention.	3. High to very intense stress due to confusion, frustration, or anxiety. High to extreme determination and self-control required.

Figure D-4. The SWAT Scale³

Task or Mission Segment: _____

Please put a mark on the scale at the point which best corresponds to how you rate your overall workload.

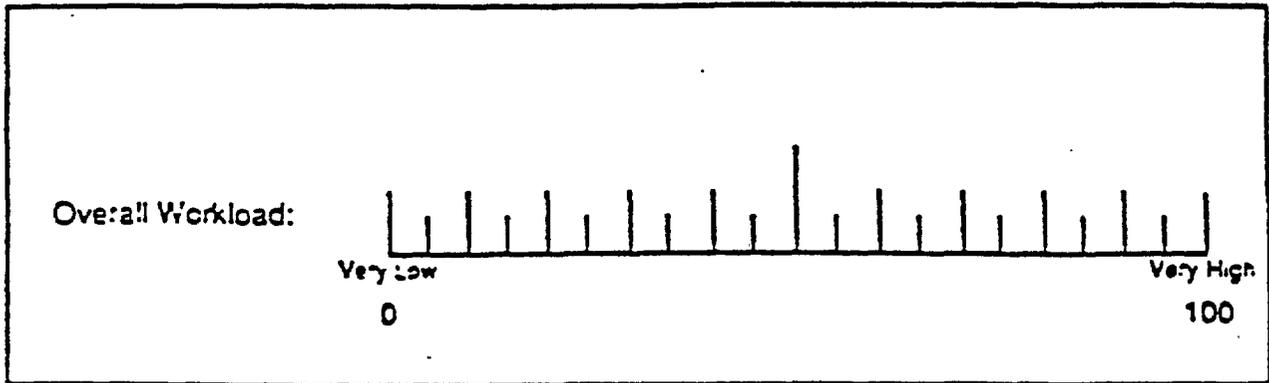


Figure D-5. The OW Scale²

REFERENCES

1. Wierwille, W. W., & Casali, J. G. (1983). A validated rating scale for global workload measurement applications. *Proceedings of the Human Factors Society 27th Annual Meeting*, 129-133.
2. Christ, R. E., Hill, S. G., Byers, J. C., Iavecchia, H. M., Zaklad, A. L., Bittner, A. C. (1993, March). *Application and validation of workload assessment techniques* (Technical Report No. 974). Washington, DC: United States Army Research Institute for the Behavioral and Social Sciences.
3. Wickens, C. D. (1992). *Engineering psychology and human performance* (2nd Ed.) New York: HarperCollins. (Pp. 364-411.)