A Novel Decision Support System for Systematic Job Matching of Individuals With Developmental Disabilities

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Background

- *"Job matching is the collaborative, data-based decision-making process used by transition teams to determine the best fit between an individual's abilities and preferences and the job's environmental and occupational demands"*[1]

- Optimal vocational performance occurs when workers' abilities are well matched to job demands[2]
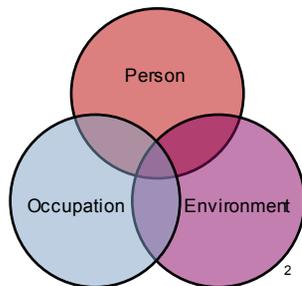
- Systematic Job Matching[3] includes:
  1. Vocational Fit Assessment (VFA)[4]
  2. Demands and Abilities Transforming Algorithm (DATA)[3]
  3. Job Matching Reports (JMR)[3]

- The Vocational Fit Assessment (VFA) was developed in an effort to operationalize this process

VFA -Worker		VFA – Job
High ability	2	High demand
Some ability	1	Some demand
Low ability	0	Low demand

- Traditionally, a professional must evaluate each individual combination of abilities and demands, each and every time they engage in the job matching process

- The Demands & Abilities Transforming Algorithm (DATA) makes evaluative judgments for each of the 9 possible combinations of abilities and demands, which enables increased:
  - Accuracy
  - Consistency
  - Efficiency

- *The purpose of this study was to determine the accuracy of the Demands and Abilities Transforming Algorithm (DATA)*

Figure. Demands and Abilities Transforming Algorithm

VFA-J Data	VFA-W Data	Evaluative Judgment	JMR Output	DATA Output
2	2	This is a great match of abilities and demands	Pro	Support
1	2	This is a good match of abilities and demands.	Pro	Support
2	1	Match may be improved by modifying abilities/ demands	Area for Intervention	Support
1	1			
1	0	This is not a good match of abilities and demands	Con	Oppose
2	0	This is not a match of abilities and demands	Con	Oppose
0	2, 1, 0	Jobs that have low demand are not modeled		

Figure. Demands and Abilities Transforming Algorithm

Methods

Study Design:
- Clinical simulation

Participants & Setting:
- Academic medical center research lab. Participants were professional key stakeholders involved in the job matching process

Procedures:
- Studies were simulated decision making scenarios.
- Participants were presented with single data points from the VFA-J and from the VFA-W and asked to make an evaluative judgment. That is, given these data alone, would they choose to support or oppose a job match?
- Responses that aligned with the comparative algorithm were recorded as successful trials. Responses that did not support the comparative algorithm were recorded as trial failures.

VFA - Job Data	Job has **high demand** for ability to communicate face-to-face.
VFA - Worker Data	Worker has **low ability** to communicate face-to-face.

Based on these data alone, would you **support or oppose** matching this person to this job?

Figure. Simulated Decision-Making Scenario

Results

Study 1
- 246/335 trials supported the DATA, a 73.4% accuracy rate
- 81 of 89 failed trials occurred when:
  - Job demands were high (VFA-Job=2)
  - Workers demonstrate some ability (VFA-Worker=1)

Study 2
- 185 trials, targeted the extremes of the DATA, in which job demands and worker abilities were either perfectly matched (i.e., high demand & high ability) or job demands greatly exceeded worker abilities (i.e., high demand & low ability), and resulted in a 100% accuracy rate.

Results (continued)

Study 3:
- 291/360 successful trials
  - Accuracy = 80.8%
  - Sensitivity = 91%
  - Specificity = 67%
  - False negative rate = 9%
  - False positive rate =33%.
  - Odds ratio = 20.5

Study 4:
- 100% of teachers who use the DATA responded that they trusted the Demands and Abilities Transforming Algorithm (DATA).

Discussion

- When an individual demonstrates some ability (VFA-W=1) and a job has at least some demand (VFA-J≥1), then the match between abilities and demands may be improved through intervention:
  1. Direct instruction to develop workers' abilities
  2. Job accommodations provided under the Rehabilitation Act or the ADA
  3. Modifications of the work environment.

- The DATA functions with perfect accuracy at its extremes

- These data strongly support the basic logic of the Demands and Abilities Transforming Algorithm

References & Resources

1. Persch, A. C., Cleary, D. S., Rutkowski, S., Malone, H. C., Darragh, A. R., & Case-Smith, J. D. (2015). Current practices in job matching for individuals with intellectual and developmental disabilities. *Journal of Vocational Rehabilitation, 43*(3).
2. Law, M., Cooper, B., Strong, S., Stewart, D., Rigby, P., & Letts, L. (1996). The person-environment-occupation model: A transactive approach to occupational performance. *Canadian Journal of Occupational Therapy, 63*(1), 9-23.
3. Persch, A. C. (2014). *The model of systematic job matching* (Unpublished doctoral dissertation). The Ohio State University, Columbus.
4. Persch, A. C., Gugiu, P. C., Onate, J. A., & Cleary, D. S. (2015). Development and psychometric evaluation of the Vocational Fit Assessment. *American Journal of Occupational Therapy, 69*(6).

Resources:
- For a digital copy of this poster, visit go.osu.edu/tetlab
- To access the VFA, visit vocfit.com

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