

Functional Measurement of Special Education Teachers' and Students' Expectations Toward Job Training for Persons with Intellectual Disability

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Abstract: Persons with intellectual disability (PWID) have fewer opportunities for enrolment in school programs and post-school employment than do their peers with typical development. Evidence suggests that attitude toward PWID is a main factor in either promoting or limiting better life conditions for this population. In this paper, the goal was to determine the cognitive information integration rules underlying the expectations of 174 special education teachers and students with regard to job training for PWID. In order to accomplish this goal, four factors (Gender, Severity of disability, Type of task, and Emotional traits) were orthogonally combined to implement a cognitive algebra study design. We obtained 48 experimental conditions, with each one presented as a scenario describing a PWID in a work training situation. Participants read these scenarios and were asked to judge the probability of the success of PWID with regard to learning the skills needed to complete the required work. Patterns of response allowed us to identify low, moderate, and high viewpoints with regard to participants' judgments of predicted success. Personal factors (Emotional traits and Severity of disability) and the Type of task factor were considered the most important in influencing the participants' judgment. These factors seemed to be integrated in a complex systematic cognitive pattern. Implications from this type of result with regard to PWID and work training are discussed in this paper.

Keywords: Intellectual disability, attitudes, special education teachers, work training, cognitive algebra.

To many adults, the idea of getting a job is a meaningful aspect of our basic life expectancy. Generally speaking, paid employment is not only a well-evaluated social concept associated with wealth, health, economic benefits, and good use of time [1] but it is also associated with psychological dimensions like self-esteem and self-concept [2,3], and strengthens both identity and the sense of self-value [4,5]. Moreover, paid employment seems to be associated with life satisfaction [6] and, even more importantly, it imposes a sense of purpose on people's daily experiences [7].

Unfortunately, not all people have the opportunity to gain dignified, paid work. This is frequently the case for people with intellectual disability (PWID), many of whom are underemployed or, as a worst case scenario, jobless [8]. Compared to typical individuals, the PWID population is three to four times less likely to obtain a job [9].

Usually, PWID face tremendous problems regarding job inclusion as well as maintaining employment.

Academically speaking, not much is known about the nature of factors determining this phenomenon (e.g., moving from school to job inclusion [10], job selection [11], getting and maintaining a job [9], PWID job experiences [12], employers' experiences with hiring PWID).

Overall, previous research addressing this topic has pointed out that the employment-related variables of PWID (e.g., job preferences [13], personal preferences [14], employee demographic profiles [13], motivation and expectations about job attributes [9]), as well as contextual factors (family composition during formative years, school-based staff, early employment experiences, and the community's rehabilitation culture [14]) affect their job opportunities.

In addition, some research suggests that the expectations of PWID with regard to having a job in the future have a profound impact throughout their lives on their rights to access job opportunities, as well as their job conditions. For instance, Doren, Gau, and Lindstrom [15] suggested that parents' expectations about job inclusion significantly predict the capacity of PWID to be independent and that that, in turn, predicts achievement after graduation from school (e.g., obtaining a well-paid job). Complementary research by

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Holwerda, Brouwer, de Boer, Groothoff, and van der Klink [16] found evidence supporting the positive relationship between expectations and the job achievements of PWID. In particular, their results showed that school teachers' expectations for job inclusion were better predictors of the job achievements of PWID than were parents' expectations, and that parents' expectations were, in turn, better predictors of job inclusion than were the expectations of young adult PWID with regard to getting a job.

By considering this academic evidence, the current study explored the cognitive mechanisms underlying beliefs systems, with the aim of determining how the judgments of special education teachers and students with regard to PWID job training relate to job opportunities in Mexico. In particular, the goal is to determine how a variety of factors are evaluated during judgment formation regarding this topic. It is assumed that by comprehending the systematic cognitive functioning underlying judgments about the job opportunities afforded to PWID, it will be possible to specify special education teachers' and students' attitudes and behaviors toward PWID achieving job inclusion.

In order to deal with this academic interest, the Information Integration Theory (IIT) approach is presented here as a useful research tool. The experimental methodology derived from IIT has been widely used to explore human judgment. Specifically, IIT postulates that relevant stimuli are extracted from an environment and psychologically represented through a valuation process with cognitive coefficients. According to this theory, a person is assumed to combine these subjective values by means of a cognitive algebra formula, dominated by addition, multiplication, and averaging, to form a unified implicit response that will produce an explicit response through an action operator.

The IIT approach provides a method to visually identify data patterns from factor interaction graphs to determine universal cognitive principles preceding behavior in several domains (e.g., attitudes toward sexuality [17], love [18], and medical concerns [19]), including the daily life of persons with atypical cognitive development (e.g., moral judgment and Down syndrome [20], love and intellectual disability [21], school inclusion attitudes [22,23], the attitude of PWID toward sexual intercourse [24,25,26]).

These cognitive processes regarding valuation, integration, and action can be used to understand and explore cognitive judgments about job training for PWID. Experimentally speaking, the main objective is to observe how much weight the study participants give to each factor, and to determine how these factors are integrated by the participants to produce a prediction about the success of a PWID successfully learning or acquiring a job skill.

METHOD

The current study applied Anderson's Functional Measurement Theory [27, 28] to the area of special education. This theory empowers cognitive scientists to look for cognitive-psychological laws underlying human judgment. Specifically, it was designed to identify cognitive (algebraic) rules used by people to integrate systematically psychological values derived from different pieces of information. Following this approach, this study considered participants' judgment about four pieces of information (Gender, Severity of disability, Emotional traits, and Type of task) regarding job training for PWID. The goal is to identify participants' judgments of the probability of a PWID to successfully learn a job skill. This academic intention can be formally expressed as the following linear combination of factors:

$$SELS = f(w_G \text{ Gender} * w_S \text{ Severity} * w_E \text{ Emotionality} * w_T \text{ Task})$$

Where the estimation of successfully learning a skill (SELS) is an information integration cognitive operation (*) combining weighted (w) information factors.

Participants

A sample of 174 participants was recruited, 59 of whom were special education students (44 women and 15 men). The age range for this sample varied from 18 to 26 years ($M = 18$, $SD = 1.2$). The rest of the sample was made up of 115 special education teachers (105 women and 10 men). Their age range varied from 21 to 58 years old ($M = 32$, $SD = 10$). All participants either studied or worked in the public education system.

Instruments

We obtained 48 vignettes regarding different training scenarios for PWID, developing a repeated measures factorial design that combines four factors and their levels in an orthogonal way; that is, 2 (Gender: female vs. male) \times 3 (Severity of disability:

low vs. moderate vs. severe) \times 2 (Emotional traits: stable vs. volatile) \times 4 (Type of task: technological vs. manual vs. service vs. artistic).

Specifically, each vignette described a scenario for a PWID engaged in a training situation. At the end of each scenario, the study participant was asked to rate on a 10-point scale (1 = completely unsuccessful to 10 = completely successful) how probable it was that the scenario actor could learn a job skill. A scenario example can be seen in Appendix 1. Additional demographic information (age, gender, educational level, religious beliefs, and religion) was obtained from the participants through a brief questionnaire.

Procedure

First, participants were divided into groups. Second, verbal consent was obtained and instructions were provided to all of them. Subsequently, they proceeded with the study, wherein they were required to read each of the 48 scenarios and to rate each of them by using the 10-point ranking scale. Scenarios were randomly presented on printed paper cards. The required time to complete the study varied between 50 to 70 minutes.

RESULTS

First, a cluster analysis of the raw data (K-means, Euclidean distances) was carried out to see if teachers could be grouped by patterns of response. Subsequently, for each identified group an analysis of variance (ANOVA) was conducted of the participants' responses, according the study design. The objective of this analysis was to explore the cognitive nature typifying judgment within each cluster of participants, as well as to observe the effect of, relevance of, and interactions among the study factors, given the nature of each cluster.

Cluster Analysis

A cluster analysis of the raw data from the 174 participants was carried out. Considering the patterns of response, three clusters were identified (see Table 1).

These results suggest that each cluster represents a different point of view about job training for PWID. This view varied from a high to a low level of expectation that PWID could learn a job skill. It is also noteworthy that a considerable percentage of participants is grouped inside the moderate expectation of success cluster.

ANOVA Results

The results of the $2 \times 3 \times 2 \times 4$ (Gender \times Disability severity \times Emotional traits \times Type of task) ANOVA that was conducted for each obtained cluster are shown in Table 2. The significance criterion was set at $p < 0.001$. The following three out of the four factors proved to be significant across all of the groups' judgments: Emotional traits, Severity of disability, and Type of task. However, the valuation for each of these factors differed across the clusters (see Figure 1). For example, the *low optimistic view cluster* gave the highest weight to Severity of disability ($\eta^2_p = 0.70$ vs. 0.56 for Emotional traits and 0.12 for Type of task), whereas for the *moderate optimistic view cluster*, the strongest obtained effect was for the Emotional traits disability factor ($\eta^2_p = 0.72$ vs. 0.58 for Severity of disability and 0.21 for Type of task). Similarly, the strongest main effect for the *high optimistic view cluster* was obtained for the Emotional traits disability factor ($\eta^2_p = 0.74$ vs. 0.67 for Severity of disability and 0.28 for Type of task).

Regarding the information integration cognitive mechanism typifying participants' judgments, the

Table 1: Means of Favorable Expectations (M) and Demographic Characteristics Clusters

| Group of the special school system | Distribution of clusters | | | Total |
|------------------------------------|--|---|---|-------|
| | <i>Low favorable expectation</i> (n= 46, 26%) (M =4.5) | <i>Moderate favorable expectation</i> (n= 76, 44%) (M =6.4) | <i>Highly favorable expectation</i> (n= 52, 30%) (M =8.2) | |
| Teachers (M = 6.3) | 35(30%) | 47(41%) | 33(29%) | 115 |
| Students (M = 6.7) | 11(19%) | 29(49%) | 19(32%) | 59 |
| | | | Total | 174 |

Table 2: ANOVA Results for the Three Clusters

| Source | df | MS | df | MS | F | p | η^2 |
|---|----|---------|-----|-------|---------|-------|----------|
| <i>Cluster 1 <<Low optimistic view>></i> | | | | | | | |
| Gender (G) | 1 | 0.58 | 45 | 2.28 | 0.25 | ns | 0.005 |
| Severity Disability (S) | 2 | 1452.17 | 90 | 13.61 | 106.64 | 0.001 | 0.70 |
| Emotional traits (E) | 1 | 2730.96 | 45 | 46.32 | 58.94 | 0.001 | 0.56 |
| Task (T) | 3 | 47.85 | 135 | 7.47 | 6.40 | 0.001 | 0.12 |
| G x S | 2 | 0.36 | 90 | 1.64 | 0.21 | ns | 0.004 |
| G x E | 1 | 0.95 | 45 | 1.85 | 0.51818 | ns | 0.01 |
| G x T | 3 | 0.857 | 135 | 2.05 | 0.41 | ns | 0.009 |
| SxE | 2 | 84.57 | 90 | 2.81 | 30.04 | 0.001 | 0.40 |
| SxT | 6 | 2.48 | 270 | 2.02 | 1.22 | ns | 0.02 |
| ExT | 3 | 4.59 | 135 | 2.34 | 1.95 | ns | 0.04 |
| <i>Cluster 2 << Moderate optimistic view >></i> | | | | | | | |
| Gender (G) | 1 | 2.69 | 51 | 0.78 | 3.45 | ns | 0.06 |
| Severity Disability (S) | 2 | 244.06 | 102 | 3.39 | 71.93 | 0.001 | 0.58 |
| Emotional traits (E) | 1 | 1133.46 | 51 | 8.62 | 131.34 | 0.001 | 0.72 |
| Task (T) | 3 | 31.85 | 153 | 2.24 | 14.16 | 0.001 | 0.21 |
| G x S | 2 | 2.17 | 102 | 0.91 | 2.38 | ns | 0.04 |
| G x E | 1 | 2.31 | 51 | 0.74 | 3.11 | ns | 0.05 |
| G x T | 3 | 2.21 | 153 | 0.73 | 3.02 | ns | 0.05 |
| SxE | 2 | 2.38 | 102 | 0.87 | 2.71 | ns | 0.05 |
| SxT | 6 | 1.34 | 306 | 0.91 | 1.47 | ns | 0.02 |
| ExT | 3 | 10.21 | 153 | 1.15 | 8.81 | 0.001 | 0.14 |
| <i>Cluster 3 << High optimistic view>></i> | | | | | | | |
| Gender (G) | 1 | 0.091 | 75 | 1.62 | 0.05 | ns | 0.0007 |
| Severity Disability (S) | 2 | 1830.18 | 150 | 11.83 | 154.62 | 0.001 | 0.67 |
| Emotional traits (E) | 1 | 3652.60 | 75 | 17.09 | 213.70 | 0.001 | 0.74 |
| Task (T) | 3 | 173.87 | 225 | 5.67 | 30.63 | 0.001 | 0.28 |
| G x S | 2 | 1.35 | 150 | 1.42 | 0.95 | ns | 0.012 |
| G x E | 1 | 0.41 | 75 | 1.42 | 0.28 | ns | 0.003 |
| G x T | 3 | 0.34 | 225 | 1.94 | 0.17 | ns | 0.002 |
| SxE | 2 | 11.79 | 150 | 2.86 | 4.11 | ns | 0.05 |
| SxT | 6 | 5.96 | 450 | 2.07 | 2.87 | ns | 0.03 |
| ExT | 3 | 28.11 | 225 | 2.71 | 10.34 | 0.001 | 0.12 |

obtained results suggest that participants seemed to use a multiplicative rule to combine study factors. This can be deduced by considering Anderson's Information Integration Theory [24, 25] postulation that systematic graphic data patterns of performance reveal algebraic schema integration (additive, multiplicative, or average). For example, the use of multiplicative rules is

characterized by a linear fan pattern of response in a factor integration graph, as exemplified by the obtained pattern in this study. See, in particular, the way the experimental factors influenced judgment formation in Figures 1 and 2. Two interactions can be identified. First, in Cluster 1, one significant interaction relates to the Severity of disability and Emotional traits factors,

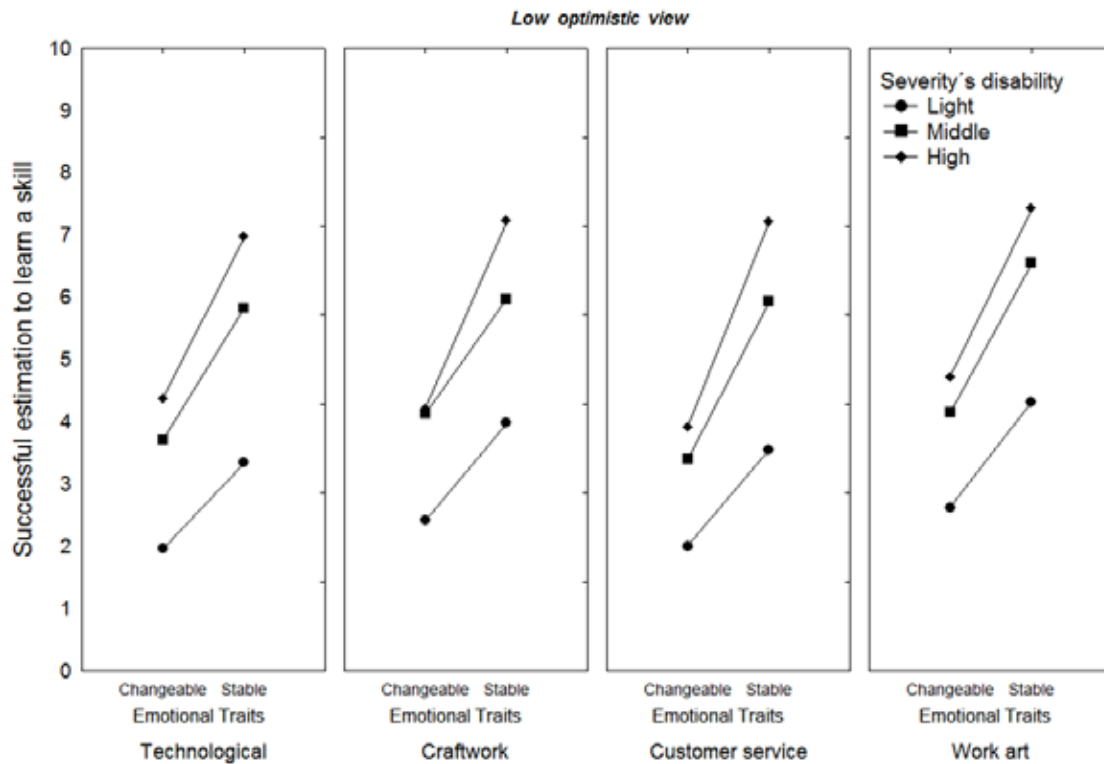


Figure 1: Interaction graph demonstrating the combined effect of Severity of disability, Emotional traits, and Type of task factors on the first cluster of participants' judgments of the success of PWID in learning a job skill.

$F(2, 90) = 30.04, p < 0.001$. The effect of the Severity of disability factor was stronger when the PWID was emotionally stable ($M = 6$) than when the person was volatile ($M = 3$).

Second, in Cluster 2, a significant interaction was found between Emotional traits and Type of task factors, $F(3, 153) = 8.81, p < 0.001$. The Emotional traits factor seemed more relevant when the Type of task to learn was a job related to art (6.9) than when the job was typified by a manual dexterity (6.6), technological (6.3), or customer service (5.8) context. The same result was obtained for Cluster 3, $F(3, 225) = 10.34, p < 0.001$. The Emotional traits factor had a stronger effect when the Type of task was related to art (8.4) than when it was related to a manual dexterity (8.3), technological (8.1), or customer service (7.95) context.

DISCUSSION AND CONCLUSION

This study explored special education teachers' and students' expectations toward job training of PWID. Overall, the study results showed a low to high positive expectation of success in job training of PWID, depending on the group of participants. Individual factors (e.g., the Emotional traits factor and the cognitive condition) seemed to play an important role in

forming participants' expectations. However, it is possible that a higher optimistic expectation could be generated when the judgment is based on attributes relevant to social adaptation, such as emotional traits.

Our results pointed to two ways to evaluate the spectrum of job opportunities for PWID. First, the Cluster 1 participants' judgments appeared to be underlined by a classical point of view, whereby the intellectual condition is a more relevant factor than is adaptive abilities in determining the future of PWID (disease view [29]). On the other hand, participants in Clusters 2 and 3 considered the emotional profile as the aspect of primary importance to learning a job skill. This view is consistent with the idea that social abilities are an important factor to achieve success in social environments, as well as in the workplace. Nevertheless, emotion plays an important role for adaptation to human environments. In particular, no emotional regulation (as is common in many PWID) results in less acceptance from peers, teachers, or other persons. This lack of emotion regulation might reduce the possibility of being included in any environment.

For the three clusters, external factors as regards the nature of the task were considered less important to learning a job skill. However, it is interesting to note

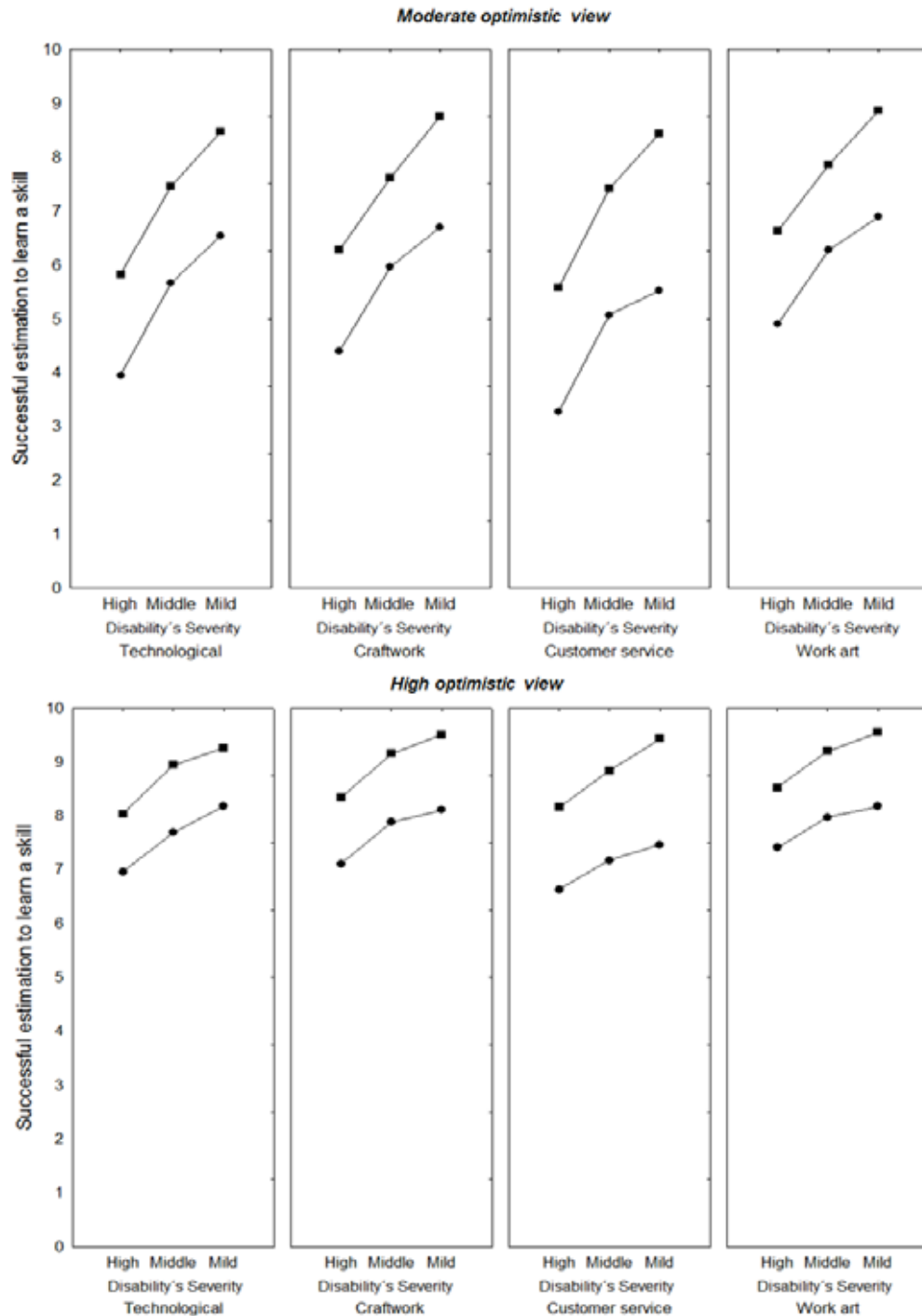


Figure 2: Interaction graph demonstrating the combined effects of Emotional traits, Severity of disability, and Type of task factors on the second cluster (top panels) and third cluster (bottom panels) participants' judgments of the success of PWID in learning a job skill.

that participants attributed to PWID a higher capacity for learning performance activities (e.g., music, painting, handcrafts, computer skills) than social interaction skills (e.g., customer service).

Concerning the judgment formation for probability of the success of PWID in specialized job training, this thinking process seems to be underlined by a complex

information integration cognitive mechanism. The study results herein put forward a multiplicative cognitive rule to form expectations of success (see Figures 1 and 2).

Overall, results suggest that when PWID are training for a job, teachers and students in the special education system consider that successful job training depends more on individual than on contextual factors.

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