Weaving the Mat: Longitudinal Study of Development of Children with Visual Impairment

South Pacific Educators in Vision Impairment
Auckland, NZ
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UNIVERSITY of NORTHERN COLORADO

Bringing education to life.

Blind children can learn to walk just as soon as seeing ones, only they have to be led around in the beginning more frequently than the others.

- Kleig (1836)

Studies of blind children and their development indicate that the sequence of development is, in general, unchanged by blindness, while the appearance of the various developmental stages varies a great deal from individual to individual.

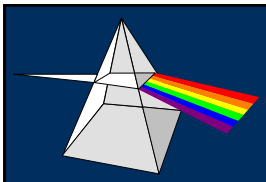
Lowenfeld (1956)

The growth and development of the blind child is more LIKE than UNLIKE that of the sighted child. In each area his growth and development passes through the same sequence, but his rate may be slower due to direct and indirect influences of his visual impairment.

- Scholl (1973)

There is little hard evidence that the rate and sequence of development of visually handicapped infants are any different from those of sighted infants. It is even legitimate to question whether the knowledge of risk actually causes, rather than ameliorates, the problems that have been documented in some children.

- Ferrell (1986), p. 124

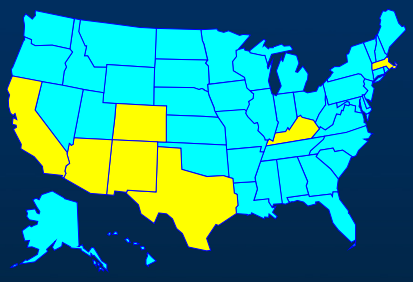


Project PRISM Overview

- Funding from US Department of Education ($750,000)
- Four years of data collection
- 202 children and their parents
- Majority of children followed for 2 years or more
- 50 assessors, advisory committee members, consultants

Collaborating Agencies

- Anchor Center for Blind Children
- Blind Childrens Center
- Dallas Services for Visually Impaired Children
- The Foundation for Blind Children
- New Mexico School for the Visually Handicapped Preschool
- Visually Impaired Preschool Services



Research Question

Are there differences in the rate and sequence of development of young children with visual impairments?

Subject Selection

- New referrals to collaborating agencies
- Less than 12 months' CA
- Diagnosed visual impairment, with or without additional disabilities and/or health conditions

Assessment Protocol

- At referral
  - 4 months
  - 8 months
- 12, 18, 24, 36, 48 months
- Project evaluators assessed children
- Parents completed packets and submitted directly to PRISM

Child Measures

- Teller Acuity Cards
- Battelle Developmental Inventory
- Vineland Scales of Adaptive Behavior
- Temperament Scales
- Milani-Comparetti Motor Development Screening Test
- ABILITIES Index
- Medical and health questionnaires

Family Measures

- Demographic information
- Parenting Stress Index
- Family Resource Scale
- Home Observation and Measurement of the Environment (HOME)

Service Measures

- Amount, type, and extent of special education and related services
- Parent satisfaction with services
- Primary interventionist's perception of Family's participation in services

Inter-observer Agreement

	Trainings	Site Visits	Project End
Battelle	85.9	92.9	80.6
HOME	88.4	95.1	85.4
Milani	85.6	89.7	75.8
Teller	83.6	89.7	91.0
Vineland	91.2	95.2	83.2
Mean	86.7	92.9	83.2

Number of Assessments

	Total	Average per Child
Battelle	569	2.82
HOME	544	2.69
Milani	248	1.23
Teller	543	2.68
Vineland	542	2.68

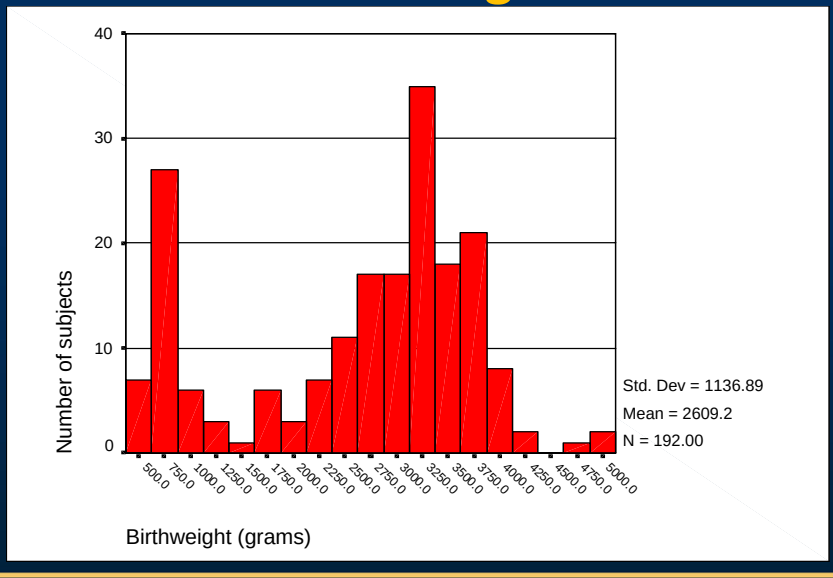
Parent Assessments

Assessment	Number
Family Resource Scale	384
Functional Status II®	409
Health Questionnaire	406
Income	343
Evaluation of services	305
Parenting Stress Index	375
Public assistance	423
Temperament	386

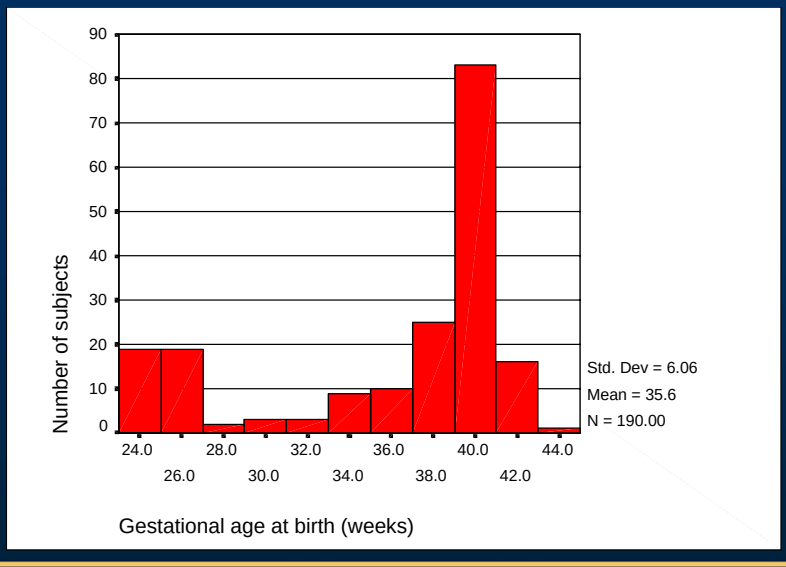
Limitations

- All participants received services,
  - From specialized agencies for visual disabilities.
- The intensity, duration, and frequency of services differed across participants.
  - But didn't seem to make much difference.

Birth Weights



Gestational Age at Birth



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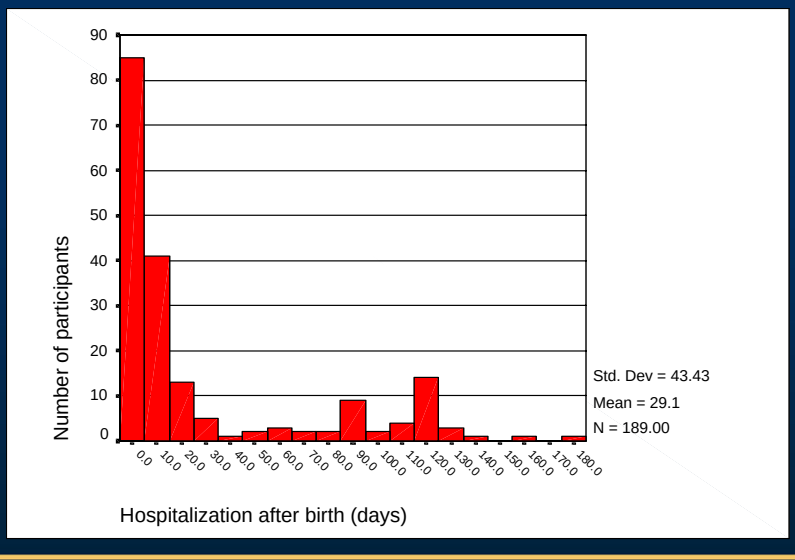
Hospitalization



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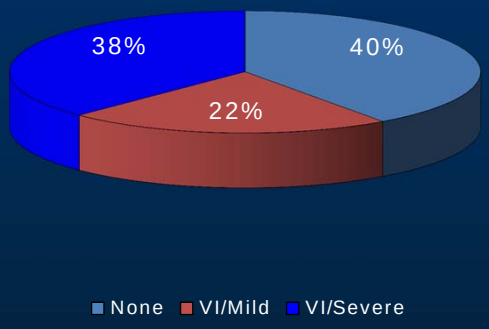
Additional Disability



(PRISM, n = 202)

Visual Disorders of PRISM Children

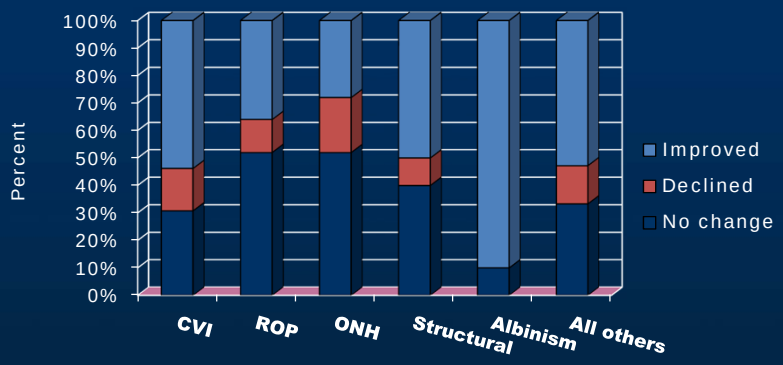
	Number	Percent
Cortical visual impairment	41	20.6
Retinopathy of prematurity	38	19.1
Optic nerve hypoplasia	33	16.6
Structural anomolies	22	11.1
Albinism	16	8.0
Retinal disorders	15	7.5
Anoph-/microphthalmia	10	5.0
All other	22	11.0
Resolved	2	1.0

T-Test for Teller Card Scores

Visual Acuity	N	Mean log	s.d.	*t*	df	Sig
Project entry	116	.1850	.4015	-.5150	115	.000
Project end	116	.3827	.4079			

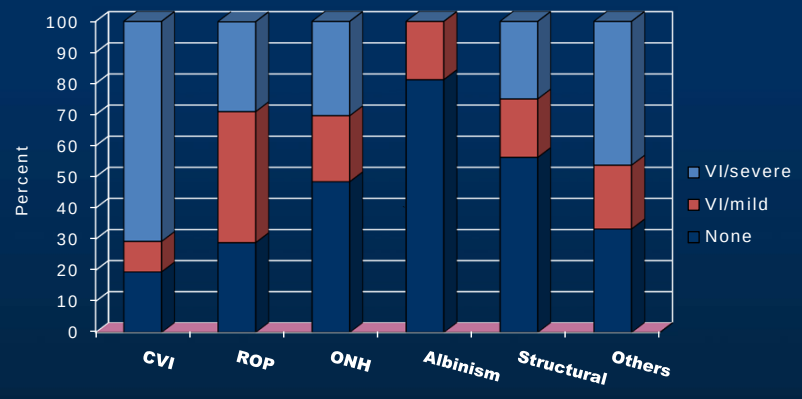
Changes in Visual Function

by Visual Disorder



(PRISM, n = 142)

Additional Disability Risk
by Visual Disorder



(PRISM, n = 199)

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The primary question is not what you know, but how you know it.

(Aristotle)

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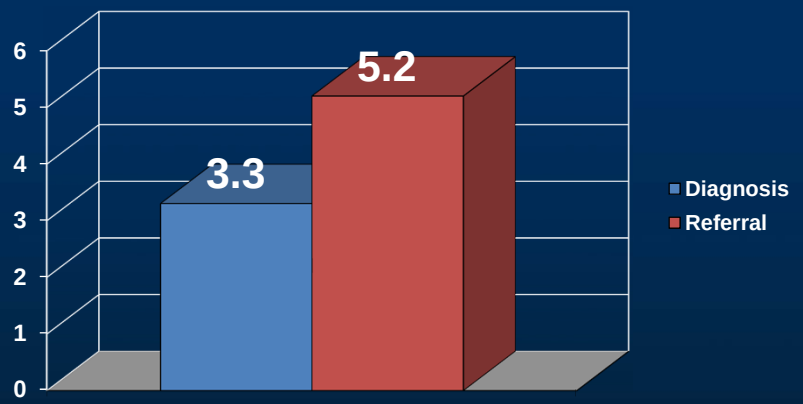
Delay from Diagnosis to Referral



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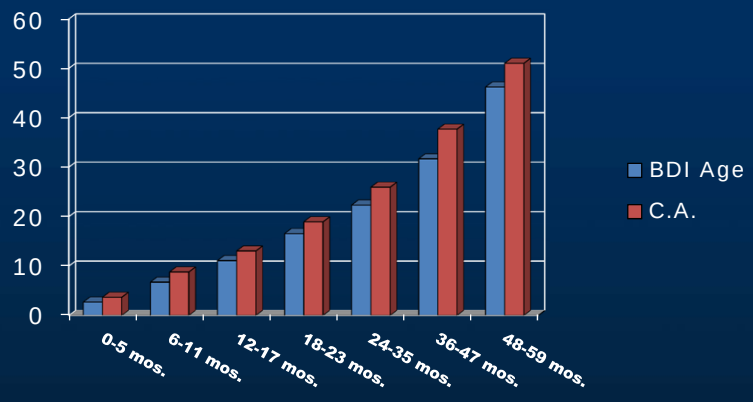
Children with VI Only



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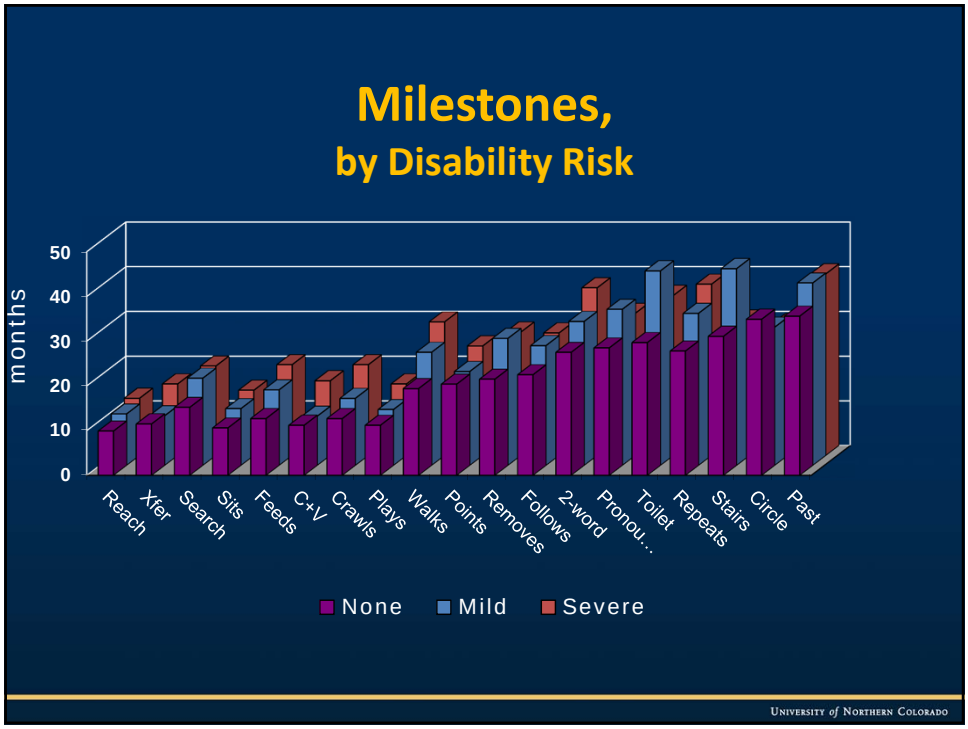
Milestones,
by Disability Risk
months
50
40
30
20
10
0
Reach
Xfer
Search
Sits
Feeds
C+V
Crawls
Plays
Walks
Points
Removes
Follows
2-word
Pronou…
Toilet
Repeats
Stairs
Circle
Past
None
Mild
Severe
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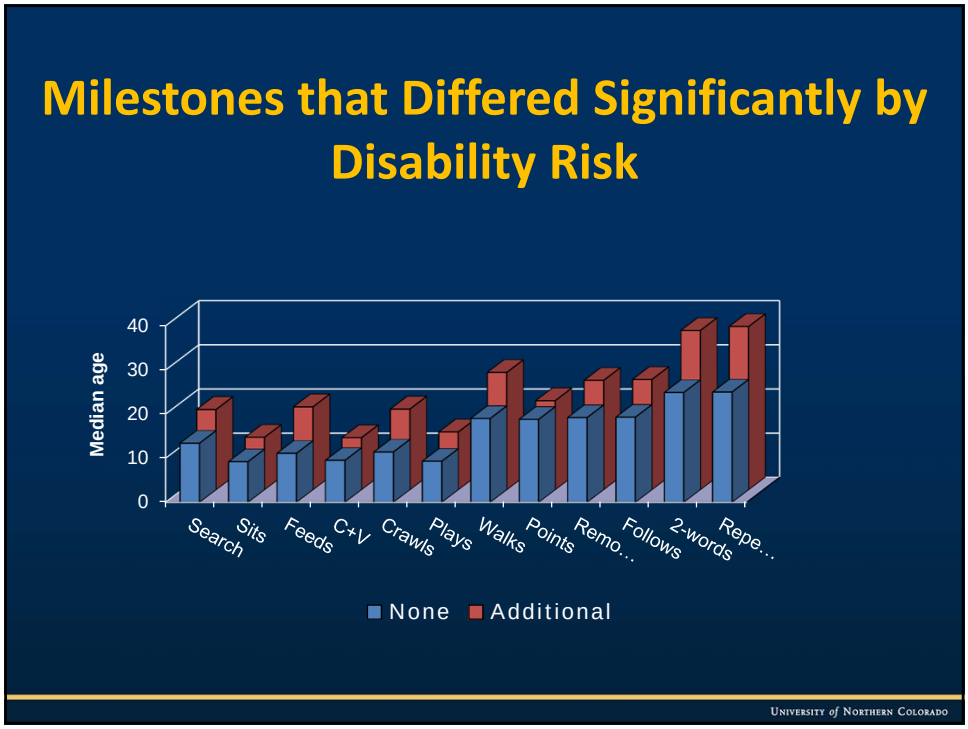
Milestones that Differed Significantly by Disability Risk
Median age
40
30
20
10
0
Search
Sits
Feeds
C+V
Crawls
Plays
Walks
Points
Remo…
Follows
2-words
Repe…
None
Additional
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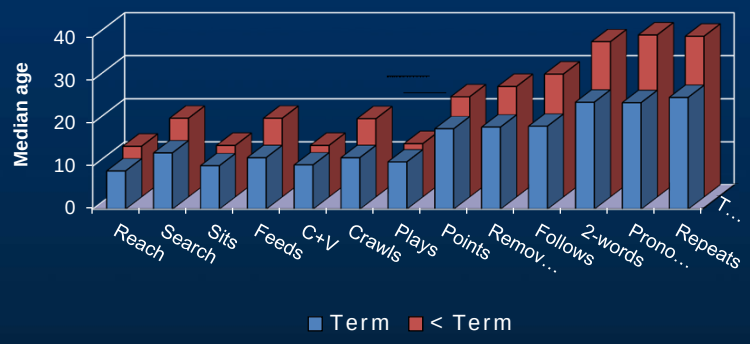
Milestones that Differed Significantly by Gestational Age



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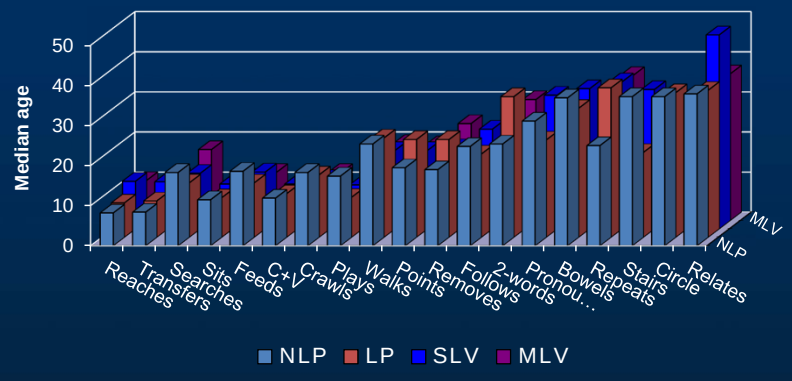
Milestones, by Visual Function



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Rate of Development, by Disability Risk

- Vineland & Battelle scores higher for children with no additional impairments, across almost all age groups
  - Not evident at 0-5 mos.
  - At 48-59 mos., mild additional disability similar to no additional disability
    - Effects of mild impairment may disappear over time

Parenting Stress Index

- Higher percentage of high scores than in the norming population
  - Not on child subscale at 0-5 mos.
  - Higher scores primarily due to child subscale, not parent subscale

No Significant Differences

between additional disability groups

- Birth weight
- Gestation
- Parents' age or education level
- Parent evaluation of services
- Primary interventionist's rating of parent participation

Significant Differences
between additional disability groups

- Battelle scores after 5 months
- Age at entry
  - Additional disability group entered later
- Home learning environment at 18-23 and 24-36 months
  - Lower scores for additional disability group
- Hospitalization after birth
  - Longer for additional disability group

- Overall health between 6-23 mos.
  - Additional disability group less healthy
- Child-associated stress at 6-11 mos.
  - Stress for parents of additional disability group greater

Advantages Not Apparent

- Greater visual functioning
- Specialized programs
- Income
- Home learning environment

Apparent Advantages

- Higher birth weights
- No additional disability
- Less hospitalization after birth

Needed, Infancy to 18 Months

- More toys that are
  - Interactive
  - Manipulative
  - Problem solving
- More books
- More literacy events

Did children with visual impairment attain developmental milestones at chronological ages that differ from sighted children?

- 12 milestones delayed
- 5 milestones within the range of typical acquisition
- 2 milestones acquired early

Did children with visual impairments attain developmental skills in a different sequence than sighted children?

- 7 milestones acquired in a different sequence
- 3 acquired later:
  - Searching for dropped object
  - Feeding bite-size pieces
  - Crawling 3 or more feet

- 3 acquired later by children with additional impairments:
  - Walking without support
  - Controlling bowel movements
  - Repeats 2-digit sequences

Were there differences in the rate and sequence of development among children with different visual disorders?

- For 10 milestones, children with ROP acquired skills later than other children with visual impairments
- Children with albinism scored significantly higher Vineland and Battelle scores at ages 6-11, 12-17, and 18-23 months.
  - Also at 24-35 mos., but only for Battelle
- No significant differences at 36-47 and 48-59 months

Were there differences in the rate and sequence of development among children with varying levels of visual function?

- Only one milestone demonstrated a significant difference among visual function levels:
  - Plays interactively with adults.
  - Children with NLP acquired later
- Differences not apparent for any other milestone

- Milestones acquired in different order by visual function level,
  - But not statistically significant
  - No pattern is apparent
- No differences in Vineland and Battelle scores for 0-5, 12-17, or 36-47 month age groups

- At 6-11 and 18-23 mos., children with moderate low vision scored significantly higher than children with NLP
- At 24-35 and 48-59 mos., children with moderate low vision scored significantly higher than children with NLP on the Battelle only

Were there differences in the rate and sequence of development between groups of children with and without additional disabilities?

- Children with additional disabilities generally acquired milestones later
- Age of acquisition was significantly later for children with additional impairments for 12 of 19 milestones
- Children without additional disabilities acquired some milestones (6) sooner, or within the range (4) of typical children

- Vineland and Battelle scores were significantly higher for children with no additional disabilities at all age groups except 0-5 mos.
- At 36-47 and 48-59 mos., development of children with mild additional impairments were more like those with no additional impairment.

Were there differences in the rate and sequence of development among children who differ along various social, cultural, or other variables?

- No differences in development apparent based on income, ethnicity, parent age, parent education, or other socio-cultural variables.
- Age of acquisition for 13 milestones was significantly different for children whose gestation was full-term.
  - Acquired milestones earlier.

Thoughts . . .

- For children receiving services, degree of visual loss may not have as great an impact on early development as the literature suggests
- Greatest impact seems to occur with the presence of additional disabilities
  - The more severe, the greater the impact

- Children without additional disability and with typical intellectual functioning do develop within the normal range of their sighted peers
  - Nevertheless, they seem to be losing 1/10th of a month per month

- Children with additional disabilities comprised approximately 60% of this sample of young children
- Children with NLP at project entry still had NLP at project end
- Children with LP or greater tended to increase their visual function over time
  - Associated with age more than any other factor

- Clinical judgments of project evaluators much better at observing present and predicting future visual function
- Children with CVI and ROP most at risk
- Children with albinism least at risk

Implications

- Degree of *visual* disability is NOT the issue
- Think about the words we choose and the messages we give

An educator has to question himself or herself about options that are inherently political, though often disguised as pedagogical to make them more acceptable within the existing structure. Thus, making choices is most important. Educators must ask themselves on whose behalf they are working.

(Paulo Freire)

Paihia Sculpture

Likewise we are the caregivers and teachers
Of children who are growing up now, and
In the days to come.


Together we can do more
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