Evaluating Early Intervention Strategies For Early Learning and Positive Mental Health

Emis Akbari, PhD
Fraser Mustard Institute for Human Development
Atkinson Centre for Society and Child Development
Ontario Institute for Studies in Education (OISE)
The Importance of Early Life in Healthy Development

• Events experienced early in life contribute to the psychobiosocial development of offspring (Caldji et al., 2000; Gonzalez et al., 2001; Lehmann et al., 2002; Moore, 1982, 1984)

• Normal variations in maternal behavior result in long-lasting changes in the offspring:
  • Differential maternal stimulation of males and females within a litter
  • Male/Female ration – differential parenting
  • High/low lickers (Meaney)

• Early life isolation or maternal separation results in:
  • increases in activity (Lovic & Fleming, 2004; Gonzalez et al., 2001)
  • deficits in attention (Lovic & Fleming, 2004)
  • impulsivity (Lovic et al., in prep)
  • deficits in maternal behavior and memory (Gonzalez et al., 2001; Melo et al., 2006)
  • deficits in social memory and spatial learning (Levy et al., 2003)
  • enhancement to the effects of psychostimulants (Akbari et al., in prep; Ammari et al., in prep; Lovic et al., 2006)
  • disruptions in reproductive reflexes (Lenz et al., 2008)
Reversal of Deficits

Mimicking the mothers’ behaviour towards her young partially or fully reverses many of these deficits

Enriched environments including physical, challenging and social environments partially or fully reverses deficits and results in a changes in the brain
Implications

• Early isolation also shows similar effects in other species. e.g. Harry Harlow’s now famous experiments: first 6 months isolation = incapable of normal sexual behavior

• Similar effects of early life isolation in rats have been found in children raised in institutions (Rutter, 1981; O’Connor et al., 2000; Fisher et al., 1997)

• Developmental neuropathology is increasingly thought to be an etiological factor in a number of mental illnesses

• There is a strong influence of early adverse events or poor parenting during childhood on the development of anxiety and mood related disorders (McCauley et al., 1997; Young et al., 1997)

• Using early isolation and maternal deprivation as a model of early life adversity may help elucidate mechanisms related to the effects of early life stress on neurobiological development and allow for new approaches for prevention and treatment of mental illnesses associated with early life stress
poor parenting to extreme deprivation
Early Preventative Intervention Strategies

**WHY PARENTING?**

Consistent relationship between early parental care & child intellectual, emotional & behavioural outcomes (Bornstein, 1995)

Time surrounding birth (especially true following the first child) – requires the greatest change of the parents’ hedonic-homeostasis (Clutton-Brock, 1991) and corresponding brain based neural circuitry (Fleming)

Problematic parenting (harsh/inconsistent discipline, low involvement, poor supervision) are major predictors of conduct problems and antisocial behaviour in children/adolescents (Capaldi et al., 1997; Loeber & Stouthamer-Loeber, 1986)

Parental behaviours have been shown to mediate a wide range of child outcomes
Family Risk Factors and Child Development

- Inadequate supervision
- Harsh, inflexible, rigid or inconsistent discipline practices
- Insecure attachment
- Low SES
- Teen pregnancy
- Marital conflict and breakdown
- Parental substance abuse
- Parental psychopathology (i.e. maternal depression)
- Low Education
- Marital conflict and breakdown
- Parental substance abuse
- Parental psychopathology (i.e. maternal depression)
- Inadequate involvement with children
- Lack of warm positive parent-child relationship

Child Outcome

- Behavioural/emotional
- Substance Abuse
- Antisocial Behaviour
- Juvenile Crime
Multilevel Risk (13%) – Low Risk (43%)
Goals & Challenges We Face

Improve parental and child competencies early in life as a means of promoting child health, development, and behaviour

1 – Choosing the appropriate aspects of parenting/environment to attempt to improve

2 – Establishing critical periods for these interventions

3 – Understanding any barriers to, or facilitators of behavioural change

4 – Designing / implementing interventions that dependently and consistently engage parents and bring about lasting changes in a cost effective manner
Intervention Strategies by Developmental Age of Children

<table>
<thead>
<tr>
<th>PERINATAL</th>
<th>BIRTH – 18 MONTHS</th>
<th>2-4 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>prenatal environment/nutrition</td>
<td>responsibility-contingencies</td>
<td>management of child initiated aversive behaviour – behavioural management</td>
</tr>
</tbody>
</table>

**Nurse-Family Partnership** (David Olds)  
**Family Integrated Care** (O’Brien)  
**Playing & Learning Strategies** (PALS – Susan Landry)  
**The Incredible Years** (Webster-Stratton)
Nurse-Family Partnership (NFP)

**Program Design**

- **PRENATAL**
  - 6-9 Home Visits
  - 75 – 90 mins/session

- **1-2 years**
  - 21-26 Home Visits

**Detailed visit-by-visit guidelines** – content reflects challenges parents likely to confront during specific stages of pregnancy and the first 2 years of life.

**Goals:**
(1) improve the outcomes of pregnancy by promoting women’s healthy prenatal behaviours
(2) improve the health and development of the child by promoting parents’ competent care of their children
(3) enhance parents life-course development by encouraging parents to plan subsequent pregnancies, complete their education, and find work
Counties Served by the NFP as of Sept 2007
From 2008-2012, in a collaboration between McMaster University and the City of Hamilton Public Health Service, a pilot study to determine the feasibility and acceptability of delivering the NFP program to Canadian families was completed.

Hamilton Community Foundation implements the NFP – 1/9 pregnancy are between ages of 15-19 (higher than the Canadian average).

January 2012 – BC launched the NFP to high risk families.

Transportability is demonstrated to be better in districts with poorer access to medical care and support resources – does very well in the USA but not as well in communities with good health care and resource support.
Family Integrated Care (FIC)

• In the NICU, infants are physically, psychologically and emotionally separated from their parents

• Many programs have addressed this issue (e.g. kangaroo care) – to encourage greater parent involvement

• Parents often see themselves as “voyeurs” who are “allowed” to hold their infants – resulting in feeling anxious and unprepared after discharge
Family Integrated Care (FIC)

Program Design

• Mount Sinai Pilot Study – RCT currently underway

• Parents learn how to provide all care (except I.V. fluid and medication administration) for their infants in the NICU

• Nurses become educators and coaches for the parents

• Multidisciplinary project, the FIC program was designed by veteran NICU parents, a physician, nurses, a parent educator, a lactational consultant and a social worker.

• Parents are provided parking/transit passes, rest/sleep rooms, kitchen, screens and breast-pups, psychological support by veteran parents, education sessions

• Based on the ‘Humane Neonatal Care’ model in Estonia (Adik Levin)
Family Integrated Care (FIC)

**Program Design**

- **7am**
- **>8 hours**
- **8pm**

**Education session**
- set curriculum
- coordinated and led by a parent resource nurse/veteran parent
- held at bedside or classroom
- Some sessions taught by other members of the multidisciplinary team

**Medical Rounds**

**Additional session**
- One-to-one provided as needed

**Provide infant care**
- Feeding, bathing, dressing, holding, skin-to-skin care, charting, their own learning
Family Integrated Care (FIC)

- Effect Size

- Weight at discharge
- Nosocomial infection
- Retinopathy of prematurity
- Breast feeding
- Parent stress
Responsive Parenting Intervention

Program Content

Responsive parenting

Affective-emotional responsiveness
Positive affection, high levels of warmth and nurturance, acceptance of child uniqueness

Cognitive responsiveness
Maintaining child focus of interest, rich verbal input

Optimal development, Internalize/generalize learning to new experiences

Critical Developmental Periods for Influence of Parenting Style

- Infancy
- Early Childhood
Playing and Learning Strategies Intervention (PALS I & II)

10-session curriculum that targets responsive parenting style – used in LBW babies

Use of educational videotapes and critiquing the videos

Each session includes:
1) review of experiences of the prior week & efforts for target behaviours
2) describing the target behaviours for the current visit
3) watching/discussing videotapes of mothers-infants with similar background demonstrating target behaviours
4) videotaping coached interactions btw mother-child
5) supporting mother to critique her behaviours and child’s responsiveness
6) planning integration of responsive behaviours into daily activities for upcoming week

Fidelity Check at Sessions 5 & 10
Playing and Learning Strategies (PALS)

**PALS I**

- Mother Outcomes
  - Warm sensitivity
  - Maintaining focus
  - Verbal encouragement

**PALS II**

- Child Outcomes
  - Cooperation
  - Social engagement
  - Use of words
  - Receptive vocabulary
  - Coordination attention & word use

- Maternal Outcomes

- Contingent responsiveness
- Redirecting
Susan Landry: Responsive Parenting Intervention
Mediation Models

Social Skills With Mother

Intervention
PALS I/PALS II

Maternal warmth

Contingent responding

Maternal affect

Child Cooperation

Social Engagement

Display of Affect
Intervention
PALS I/PALS II

Maternal warmth

Contingent responding

Maternal affect

Avoidance of redirecting

Word use

Coordination of attention & word use

Communication Skills With Mother
The Incredible Years – Webster-Stratton

Program Content

A series of programs focused on strengthening parenting skills (monitoring, positive discipline, confidence) and promoting parents' involvement in children's school experiences in order to promote children's academic, social/emotional competencies and reduce conduct problems.

The programs are grouped by age.
Babies & Toddlers (0-3 years)
BASIC Early Childhood (3-6 years)
BASIC School-Age (6-12 years)
ADVANCED (6-12 years)

The Leader's Manuals for these programs include questions commonly asked by parents, value exercises, role play practice suggestions, home activities and handouts.

These manuals can be used when the program is being self-administered by a parent or teacher either at home, in a clinic or school.
Parents and Babies Program

Ages 0-12 months.
Consists of a 6-part program focused on helping parents learn to observe and read their babies' cues/signals and learn ways to give nurturing and responsive care including physical, tactile, and visual stimulation as well as verbal communication.

The program includes:
Part 1 - Getting to Know Your Baby (0-3 months)
Part 2 - Babies as Intelligent Learners (3-6 months)
Part 3 - Providing Physical, Tactile and Visual Stimulation
Part 4 - Parents Learning to Read Babies' Minds
Part 5 - Gaining Support
Part 6 - Babies' Emerging Sense of Self (6-12 months)
The Incredible Years – Webster-Stratton

Program Design

Parents and Toddlers Program

Ages 1-3.
It consists of an 8-part program focused on strengthening positive and nurturing parenting skills. Each program builds on the previous.

The series includes:
Part 1 - Child-Directed Play Promotes Positive Relationships
Part 2 - Promoting Toddler's Language with Child-Directed Coaching
Part 3 - Social and Emotion Coaching
Part 4 - The Art of Praise and Encouragement
Part 5 - Spontaneous Incentives for Toddlers
Part 6 - Handling Separations and Reunions
Part 7 - Positive Discipline-Effective Limit Setting
Part 8 - Positive Discipline-Handling Misbehaviour
Preschool/Early Childhood BASIC Series

Ages 3-6 Years
Consists of Programs 1 - 4 and focuses on strengthening parenting skills and consists of components which build upon one another.

The series includes:
Program 1 - Strengthening Children's Social Skills, Emotional Regulation and School Readiness Skills
Program 2 - Using Praise and Incentives to Encourage Cooperative Behavior
Program 3 - Positive Discipline - Rules, Routines and Effective Limit Setting
Program 4 - Positive Discipline - Handling Misbehaviour

Preschool Home Visiting - Coaches and Parents Manual - one-to-one option
The Incredible Years – Webster-Stratton

Program Design

School Age BASIC Series

Ages 6-12 Years
Focuses on the importance of promoting positive behaviors, interpersonal issues such as building social skills, and effective praise.

The series includes:
Promoting Positive Behaviors in School Age Children
Reducing Inappropriate Behaviors in School Age Children
Supporting Your Child's Education

ADVANCED Series

Ages 4-12 Years
Builds on the BASIC School Age Program. Focuses on parent interpersonal issues such as effective communication and problem solving skills, anger management and ways to give and get support.

The series includes:
How to Communicate Effectively with Adults and Children
Problem Solving for Parents-Adults
Teaching Children to Problem Solve
Incredible Years (IY) – International Results

Child Outcomes

- Sweeden
- Wales
- New Zealand
- Canada
- Jamaica

Effect Size

0.2
0.4
0.6
0.8
1.0
1.2
1.4

Sweeden
Wales
New Zealand
Canada
Jamaica
Eyberg Child Behaviour Inventory (ECBI)

ECBI-Intensity Scale

ECBI-Problem Scale
Child Behavior Checklist (CBCL)

**CBCL-Total**

- Post-test
- 6 mths
- 12 mths

**Average Effect Size**

**CBCL-Externalizing**

- Post-test
- 6 mths

**Average Effect Size**

**CBCL-Internalizing**

- Post-test
- 12 mths
Other Outcome Measures

SDQ-Total

![Bar chart showing the average effect size for Post-test and 6 mths for SDQ-Total.]

Social Competencies

![Bar chart showing the average effect size for Post-test and 6 mths for Social Competencies.]

Other Outcome Measures
Parenting Practices Interview (PPI)

Average Effect Size

PPI-Harsh

PPI-Inconsistent

PPI-Positive Parenting

Post-test  6 mths  12 mths  24 mths  Post-test  6 mths  12 mths  24 mths  Post-test  6 mths  12 mths  24 mths
Parent Stress Index (PSI)

- **Post-test**
  - Average Effect Size: 0.9

- **6 mths**
  - Average Effect Size: 0.7

- **12 mths**
  - Average Effect Size: 0.8
## Intervention Strategies by Developmental Age of Children

<table>
<thead>
<tr>
<th>Prenatal Environment/Nutrition</th>
<th>Responsivity-Contingencies</th>
<th>Management of Child Initiated Aversive Behaviour – Behavioural Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRENATAL</strong></td>
<td><strong>BIRTH – 18 MONTHS</strong></td>
<td><strong>2-4 YEARS</strong></td>
</tr>
<tr>
<td>Nurse-Family Partnership (David Olds)</td>
<td>Playing &amp; Learning Strategies (PALS – Susan Landry)</td>
<td>Incredible Years (Webster-Stratton)</td>
</tr>
<tr>
<td>Maternal</td>
<td>Maternal</td>
<td>Maternal</td>
</tr>
<tr>
<td>$d=0.14-0.5$</td>
<td>$d=0.33$</td>
<td>$d=0.36-0.47$</td>
</tr>
<tr>
<td>Child</td>
<td>Child</td>
<td>Child</td>
</tr>
<tr>
<td>$d=0.23-0.82$</td>
<td>$d=0.3-0.68$</td>
<td>$d=0.39-0.95$</td>
</tr>
</tbody>
</table>
PROCESS ELEMENTS
Intervention Characteristics That are Associated with Effectiveness

**Important questions**

broadly focused vs. specific focused

length & intensity of intervention

timing of intervention – critical periods

universal effectiveness or effectiveness based on specific at-risk populations
Public Dissemination & Target

Target Group for intervention
  Who are we targeting?
  How do we target?
  Timing of intervention
  Screening and assessment tools? Cost? Practicality?

Upscaling and public dissemination
  Identifying high risk groups
  How do we offer the intervention?
  How do we upscale and roll-out the intervention?
  How effective are the screening tools to pick out high risk groups?
Web-Based Delivery
Internet Usage Statistics Canada 2010

Total Across Canada

By Income

Reason for not Having Internet
Web-Based Delivery

Meta-analyses examining predictors of outcome have found that the strongest intervention effects have emerged for *behavioral programs* and for programs delivered in the *home* (Baggett et al., 2008; Bakersman-Kranenburg et al., 2003).

**Barriers to Service Delivery & Utilization**
Lack of medical coverage
Absence of reliable transportation
Lack of childcare
Limited flexibility in work schedules
Stigma associated with seeking psychological services, especially in sparsely populated and remote communities

*These barriers differentially affect women, minorities, and the poor*
Web-Based Delivery of PALS

Why appropriate for web-based delivery?
1) Manualized nature of the program
2) Videos that provide examples are easily delivered via internet
3) 10-session brief participation – retention is feasible

Four Primary Components of the Internet-Delivered PALS
1) Self-regulated learning of parenting skills that incorporate dynamic multi-media presentation and interactive queries
2) A mechanism to record remotely and transfer videos of parent-infant interactions captured through a computer “eyeball” – to encourage practice and facilitate discussion with the coach
3) Electronic system for professional and peer support
4) Online tracking system of participant knowledge acquisition and treatment engagement to monitor progress – including supervision of coaches

Literacy demands – grade 3 level – choice of audio
In the moment clarification
Mothers are asked questions to promote progressive learning of material either thought processes or assessment questions
Web-Based Delivery of PALS

After each session – mothers are asked to record a video (5 minutes) of themselves with their infant practicing the skills taught during that session

Once recorded video is sent to an automated application for review by coach

Videos reviewed on weekly basis with mothers

Coaches have weekly review sessions over the phone with the mother after she has completed a session
Infant-Net administrator page with participant video
Infant-Net administrator page participant activity

<table>
<thead>
<tr>
<th>Dates Data</th>
<th>Level Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>01/03/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/04/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/05/2008</td>
<td>1</td>
</tr>
<tr>
<td>01/06/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/07/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/08/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/09/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/10/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/11/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/12/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/13/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/14/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/15/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/16/2008</td>
<td>0</td>
</tr>
<tr>
<td>01/17/2008</td>
<td>0</td>
</tr>
</tbody>
</table>
Screen Shot of Infant-Nets PALS page

---

**Check-in**

Set Ed's audio preference [here](#).

Now it's time for "Check-in" questions.

Which of the following mom behaviors can "Maintain" a baby's interest?

- Talking about the toy your baby is playing with.
- Constantly introducing new toys to your baby.
- Showing your baby something new about the toy they are looking at.
- Letting your baby play with a toy for an extended time without saying or doing anything.

[Submit](#)
Baby’s Signals

You might have noticed the following Positive Signals:

- Reaching for and holding the toys
- Trying to copy what mom did by tapping the toys
- Focusing his eyes on the toys
- Leaning in towards mom

If you would like to review the video to see these signals, click here.
**Preliminary Results**

**Infant Positive Behaviours (Landry Obs)**
- **Intervention**
- **Control**

- $n^2 = 0.107$

**Parent Positive Behaviours (Landry Obs)**
- **Intervention**
- **Control**

- $n^2 = 0.072$

**Postpartum Depression Screening Scale**
- **Intervention**
- **Control**

- $n^2 = 0.049$

Adapted from Baggett et al., 2010
Web-based Incredible Years (IY)

Internet based with coaching and home visits

Chat rooms (social support) – has been shown to increase motivation to put what they have learned into practice

Same 250 videos offered in the group-based delivery

***Self-administered and self-paced version of the IY that includes same content as the group-based program - achieved most of the benefits by the group-based parenting program in the short-term. However, by 3-year follow-up had lost most of the gains
Web-based Incredible Years (IY)

Participants are able to watch the 250 videos in order

After each vignette, the last frame is frozen to allow a visual reminder – while audio recording poses questions similar to the group-based delivery

Summary of key points are presented with audio option to reduce literacy requirements

Have to click “next” for next vignette

Once topic is complete, several days must go by before system allows for next topic to give parents time to practice the skills

Home visits after topic 4 and 7 (coach must grant permission to continue)

4 home visits per family

Regular phone calls to reinforce and encourage

Increased parent satisfaction
Increased goal attainment by self report