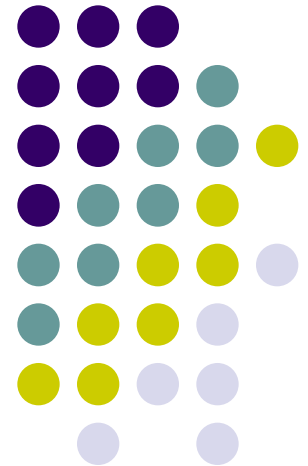
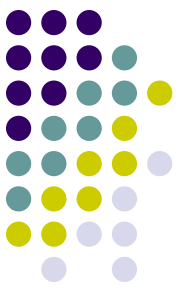


Cost-benefit analysis

Stephen Small
Cailin O'Connor

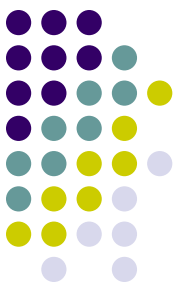
University of Wisconsin-Extension
and University of Wisconsin-Madison





What is cost-benefit analysis?

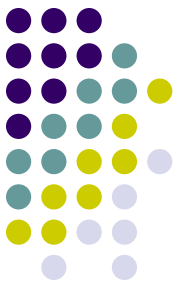
- Economic assessment of a program's impact taking costs into account
- “Evaluation of alternatives according to their costs and benefits, when each is measured in monetary terms” (*Levin & McEwan, 2002*)
- One way to determine the value of a program or intervention – and convince others that it has public value



Cost-benefit analysis:

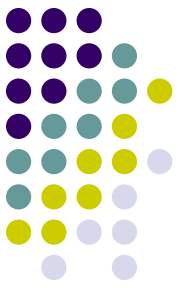
- Usually builds on rigorous program evaluation
- Typically measures a wide range of outcomes
- Usually accounts for public benefits to society but may also consider benefits to individuals and families
- Is both an art and a science – especially when assigning monetary values to benefits
- Allows for comparisons across programs, policies, and other types of interventions

Three common approaches to cost-benefit analysis



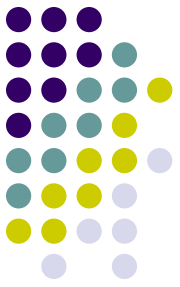
- Estimates may be based upon well-documented impacts (i.e. evidence-based programs)
- Estimates may be based upon well-documented impacts *and* future projections that build upon these documented impacts
- Estimates may be based on undocumented assumptions that the program works and hypothetical projections – but no hard data

Cost-benefit analysis basics



- The analysis takes into account:
 - Costs of program participation – for individuals, organizations, and taxpayers
 - Costs and monetary benefits – for individuals and for society – of various outcomes
 - Percentage of individuals in program group and comparison group who experience those outcomes (or are projected to experience those outcomes)
- Result: Average impact of the program across individuals

An illustration of cost-benefit analysis:



Two children born in similar circumstances

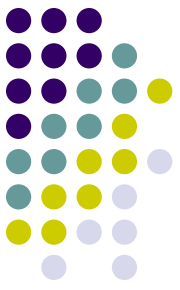


Johnny

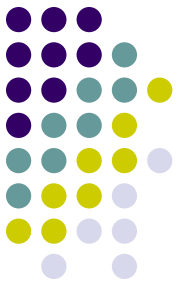


Ricky

Both live in similar environments characterized by risk factors such as:

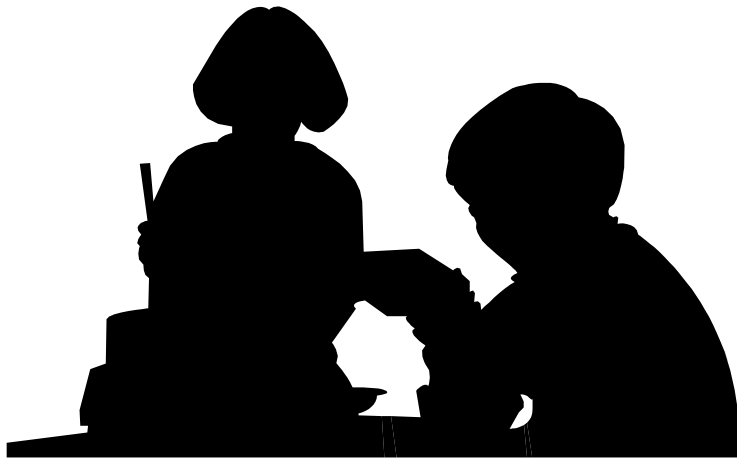


- Poverty
- Family history of criminal behavior
- Family history of maltreatment or neglect
- Single parent household
- Low parental education



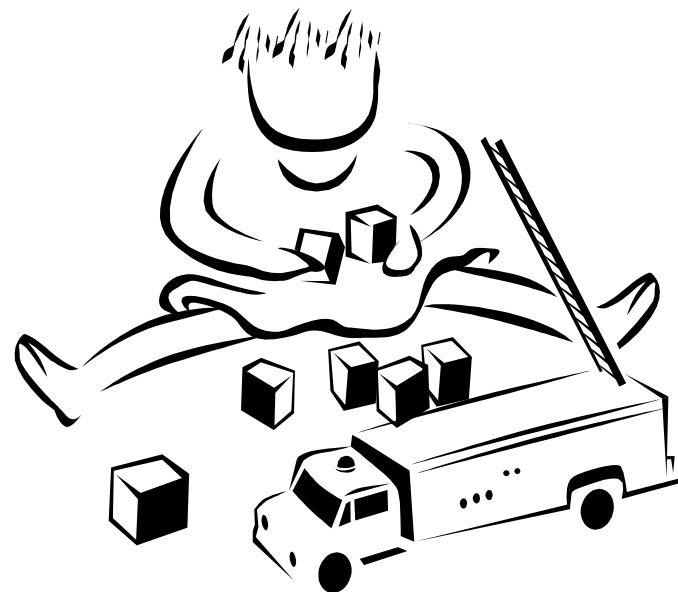
At age 3

Johnny is cared for at home by his older sibling and aunt



Johnny

Ricky is enrolled in the Chicago Child-Parent Center



Ricky

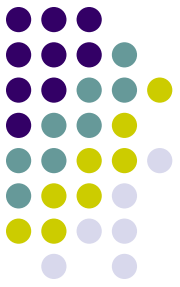
The program provides educational enrichment for Ricky



Parent education for Ricky's mother



Home visits, health screening, and other services

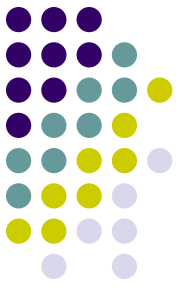


The Chicago Longitudinal Study



- Study follows a cohort of students who were 3 or 4 years old in Chicago in 1985
- Study looks at various combinations of preschool participation (1 year or 2 years), school-age program participation, or no program participation
- Wide range of outcomes measured: educational success/attainment, criminality, childbearing, etc.
- Age-21 follow-up interviews: 989 young adults who attended a Child-Parent Center preschool and 550 who did not
- Overall, the preschool program was found to have benefits of **\$10.15** for every dollar spent

Learning from Johnny and Ricky



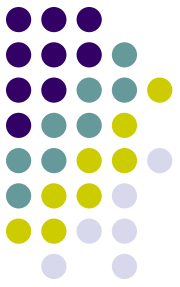
- “Johnny” and “Ricky” are examples of the best- and worst-case outcomes for youth from the study sample for CPC preschool or no CPC preschool
- We will look at Johnny’s and Ricky’s outcomes at critical points in their development, and the public costs and benefits associated with those outcomes
- We will also see what percentage of the preschool group and what percentage of the comparison group experienced each outcome, positive or negative
- Most participants in the study probably experienced a mix of negative and positive outcomes

Public costs for Johnny & Ricky in the preschool years



NOTE: All dollar amounts are converted to 2006 dollars, based on present-value calculations in 1998 dollars published in Reynolds, Temple, Robertson, & Mann (2002). Age 21 Cost-Benefit Analysis of the Title I Chicago Child-Parent Centers. *Educational Evaluation and Policy Analysis*. 24(4), 267-303.

At age 9



Johnny is enrolled in special education classes

- \$9,497 per year
for 4 years

(Above and beyond normal instruction costs)



Johnny

Ricky succeeds at school

\$0

(Only normal instruction costs)



Ricky

At age 9



Johnny is enrolled in special education classes

Ricky succeeds at school

24.6% of comparison children were enrolled in special education for at least one year, compared to only 14.4% of the preschool participants.

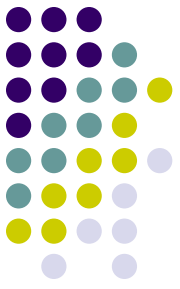


Johnny



Ricky

At age 10



Johnny is found to be the victim of child abuse

- \$10,861

(Average cost for child welfare services with a substantiated report)



Johnny

Ricky's family has no contact with the child welfare system

\$0



Ricky

At age 10



Johnny is found to be the victim of child abuse

Ricky's family has no contact with the child welfare system

10.3% of comparison children were found to be victims of maltreatment between the ages of 4 and 17, compared to only 5% of the preschool participants.



Johnny



Ricky

At age 14



Johnny is arrested

- \$16,690

(Average juvenile justice system expenditure for a court petition)



Johnny

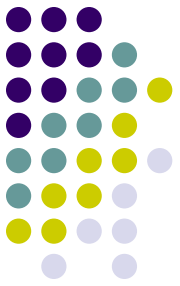
Ricky stays out of trouble

\$0



Ricky

At age 14

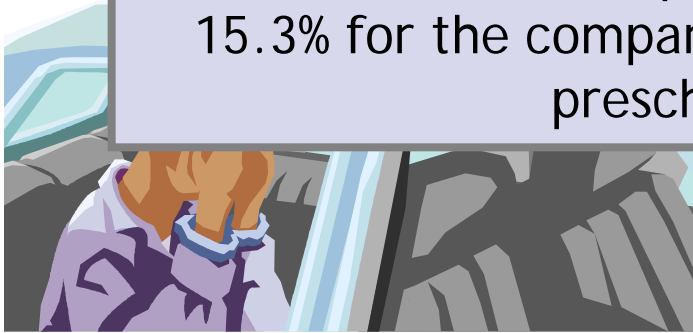


Johnny is arrested

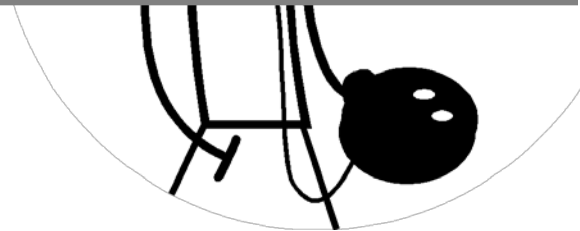
Ricky stays out of trouble

25.1% of comparison children had at least one petition to juvenile court by age 18, compared to only 16.9% of the preschool participants.

For violent arrests in particular, the numbers were 15.3% for the comparison group and 9% for the preschool group.



Johnny



Ricky

At age 14

Johnny is arrested

Ricky stays out of trouble

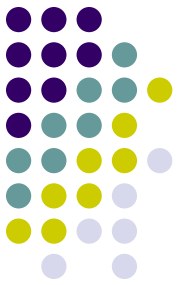
- For every 100 children served by the program, 17 eventually came into contact with the juvenile justice system.
- For every 100 children *not* served by the program, 25 had at least one petition in juvenile court.
- That means eight fewer juvenile offenders - and \$133,520 saved in the juvenile justice system alone - for every 100 children served.
- This translates to juvenile justice savings of \$1,335 for each child served by the preschool program.

Johnny

Ricky



At age 18



Johnny doesn't graduate from high school and is often unemployed

\$0



Johnny

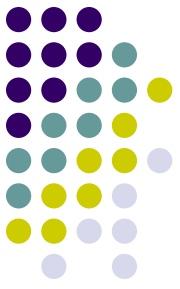
Ricky graduates from high school and enrolls in college

- \$4,039 per year for 4 years

(Average taxpayer share of cost for tuition at a Chicago university)



Ricky



At age 18

Johnny doesn't graduate from high school and is often unemployed

Ricky graduates from high school and enrolls in college

61.9% of preschool participants had graduated from high school by age 21, compared to only 51.4% of the comparison group.

At age 21, 47% of preschool participants were attending college.



Johnny



Ricky

Entering adulthood



Johnny is in and out of jail for petty crimes

- \$40,195

(Average criminal justice system expenditure over an adult criminal career)



Johnny

Ricky graduates college and gets a good job

+ \$78,838

(Increased tax revenue based on lifetime earnings of \$223,303 greater than a non-graduate)



Ricky

Entering adulthood



Johnny is in and out of jail for petty crimes

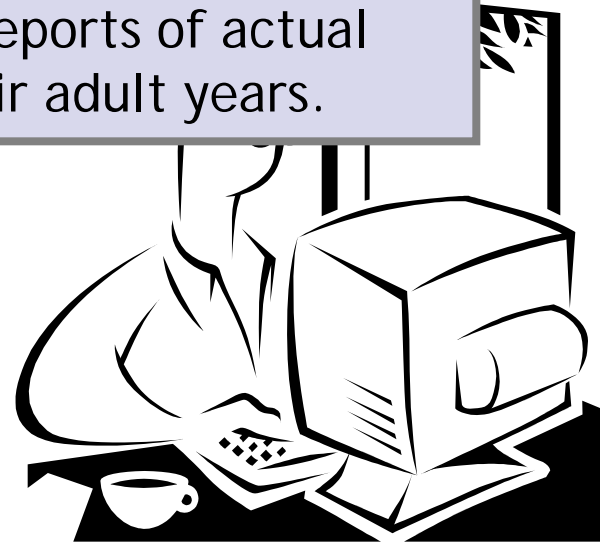
Ricky graduates college and gets a good job

These projections for adult outcomes were based on the age-21 follow-up and national statistics.

Researchers continue to track the preschool participants and comparison group and will refine these estimates based on reports of actual outcomes throughout their adult years.

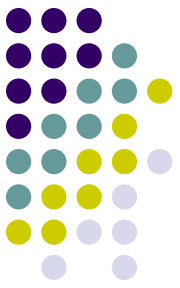


Johnny



Ricky

Other differences in Johnny and Ricky's adult lives



Johnny has poor health

Ricky is more likely to be healthy

Johnny relies on public systems for living expenses and health care

Ricky supports himself and his family, pays taxes, and stays out of trouble

Ricky is more likely to be involved in raising his own children

Based on findings from the Perry Preschool Age 40 follow-up and projections from the Chicago Child-Parent Study at Age 21

Overall costs and benefits to society



Special education
- \$37,988

Child welfare system
- \$10,861

Juvenile delinquency
- \$16,690

Adult crime
- \$40,195

TOTAL: - \$105,734

Johnny

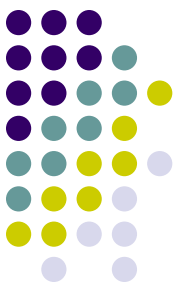
Chicago Child-Parent Center
- \$10,728

College tuition
- \$16,156

Increased tax revenue
+ \$78,838

TOTAL: + \$51,954

Ricky

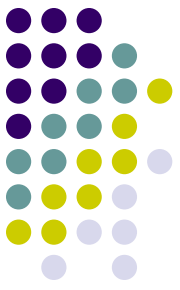


Terminology used in CBA

- Financial costs vs. economic or opportunity costs
- Personal vs. public benefits
- Present value and discounting
- Consumer price index (www.bls.gov/cpi/)

- Net economic return = Benefits – Costs
- Benefit-cost ratio = Benefits / Costs

Conservative estimates as the basis of CBA



- Over-estimation of program costs
 - Volunteer time and other “opportunity costs”
 - Economy of scale – costs of running a program often go down over time
- Under-accounting of benefits
 - Many benefits not easily assigned monetary value
 - Anything not included in program evaluation design will not be included in benefits
 - Diffusion of effects to other family members, classmates

Concerns about cost-benefit analysis



- A cost-benefit analysis is only as good as the program evaluation it's based on
- Even if the cost-benefit ratio is low, a program may still be valuable
- CBA doesn't account for outcomes that can't be monetized
- A focus on economic benefits can lead us to lose sight of other good reasons for providing services
- CBA is only one of many factors when making program decisions
- Over-generalization to other programs