

The “recipe” for good quality early childhood care and education: do we know the key ingredients?

Gordon Cleveland and Douglas Hyatt,
Division of Management,
University of Toronto at Scarborough

What and why

- ◆ Work in progress
- ◆ What factors produce good quality in child care centres?
- ◆ Interesting because:
 - Ignored by economists
 - Some work finds little effect of regulatable inputs
 - Rising policy issue (tradeoffs)
 - Sheds light on broader issue of children's development

Background

- Policy issue: what factors improve quality of child care and therefore child development?
- A majority of young children use regular non-parental care
- Quality of care matters for child development.
- Non-parental care is generally mediocre in quality (Hayes et al., 1990; Helburn et al, 1995)
- Issues: What is the role of policy-relevant inputs? What are the trade-offs?

Contributions

- ◆ New Canadian data set
- ◆ Incorporate range of productive inputs, including unobservables
- ◆ Reponse to Blau's suggested fixed-effects method
- ◆ Policy-relevant elasticities

Previous studies

- ◆ Large literature by developmental psychologists. Studies typically conclude that policy-relevant variables matter: staff-child ratio, group size, caregiver education, staff turnover, staff wages (summarized in Hayes et al., 1990). Small samples, correlations.
- ◆ More recent studies confirm conclusions (Phillipsen et al., 1997; NICHD, 1996, 2000)

Two major contributions of developmental psychologists

- ◆ Structural quality → process quality
→ child outcomes
- ◆ Development of techniques and instruments for measuring process quality (ECERS, ITERS, CIS, ORCE, etc.)

Economists (1)

- ◆ Related to educational production function literature (Hanushek, 1996).
- ◆ Mocan (1995)
- ◆ Blau (1997) U.S. National Staffing Study. Small effects of GS and s/c ratio when other observables are controlled. No evidence wages matter. With controls for unobservable centre effects, structural features no longer matter.
- ◆ Blau (2000) repeats analysis using Cost, Quality and Child Outcomes data, revising Mocan

Economists (2)

- ◆ Blau's critique of literature: 1) small non-random convenience samples, 2) relevant inputs omitted, 3) no attention to potential bias caused by unobservables.
- ◆ However, Blau concludes quality measures are reasonable and process quality does influence child development (modestly).

What is quality?

- Structural quality
- Process quality
- Child development outcomes
- ITERS/ECERS
- CIS (Caregiver Interaction Scale)

Features of ITERS/ECERS

- Process quality - global measures of child care environments and interactions; scored by trained observers; classroom-based
- include:
 - space, furnishings and materials
 - personal care routines
 - language-reasoning
 - learning activities
 - caregiver-child interaction
 - program structure
 - parent and staff needs
- scored on scale of 1 to 7 points

Caregiver Interaction Scale (Arnett's CIS)

◆ SENSITIVE

speaks warmly to children

listens attentively when children speak to her

seems to enjoy the children

explains reasons for discipline

encourages children to try new experiences

seems enthusiastic about children's activities and efforts

pays positive attention to children as individuals

talks to children on a level they can understand

encourages children to exhibit prosocial behaviour

kneels, sits or bends when talking to children

◆ Measured on 4 point scale with 1 = not at all and 4 = very much

What is our model of the production of quality?

- ◆ Various inputs can be combined to produce different levels of quality of child care
- ◆ Key inputs are:
 - structural features (staff-child ratio, group size, caregiver education/training, non-profit status)
 - other teacher characteristics
 - centre-specific characteristics
 - characteristics of children receiving care
 - error term (random unobservables, measurement error)

Production of quality

◆ Inputs are combined according to:

$$Q_{im} = f(X_{im}, Z_j) + e_{im} + u_j$$

◆ where

- X are classroom-specific variables
- Z are centre-specific variables
- e is an additive error term of classroom-specific unobservable influences
- u is an additive error term of centre-specific unobservable influences

Inputs

- ◆ Policy-relevant = staff-child ratio, group size, ECE training, non-profit status
- ◆ Teacher = gender, "marital" status, staff position, professional development, job experience
- ◆ Centre = Director's education, number of full-time staff
- ◆ Child = ages in classroom, percent receiving subsidy

Inputs (2)

- ◆ Additional resources may permit better facilities, food, upkeep. Teachers may have unobserved effort or ability
- ◆ Resources = subsidized rent/utilities, wage and operating grants
- ◆ Teacher effort/ability = practicum supervisor, recent wage increase, wage per hour
- ◆ Or, use CIS as proxy for unobserved (and observed) teacher abilities. Measurement error could correlate with ITERS-ECERS, so take instrument for CIS

Why not study child outcomes?

- ◆ Data availability
- ◆ Multiple correlated influences on child development
- ◆ Multiple aspects of child development, spread through time
- ◆ Assuming we know what a good learning environment is, how do we produce it?

Data

- ◆ Detailed on-site observations of process quality in child care classrooms - You Bet I Care! (YBIC!)
- ◆ Data from observed staff member, centre director
- ◆ 325 classrooms in 210 centres in six provinces and Yukon Territory
- ◆ Urban locations; centres chosen randomly within commercial and non-profit strata.
- ◆ Data problems: staff and children in room, inter-rater reliability, sampling lists
- ◆ Missing values – multiple imputation
- ◆ ITERS-ECERS: Cronbach's alpha .905 – 7 subscales

A properly specified regression

- ◆ Should include all potential determinants of quality on the right-hand side
- ◆ Should omit factors determined by quality or otherwise correlated with error term
- ◆ Should include proxies for known determinants of quality that are difficult to measure (unobservable)

EXPLANATORY VARIABLES	POLICY VARIABLES Estimates (t-stats)	ALL OBSERVABLE VARIABLES Estimates (t-stats)	INCLUDING RESOURCE AND ABILITY/EFFORT UNOBSERVABLES Estimates (t-stats)	INCLUDING RESOURCE AND PREDICTED ABILITY/EFFORT UNOBSERVABLES Estimates (t-stats)
Policy-relevant Variables				
Staff-child ratio	2.970** (3.74)	2.496** (3.05)	2.478** (2.95)	1.969** (2.39)
Square of s/c ratio	-1.275** (2.63)	-1.086** (2.21)	-1.081** (2.17)	-0.954** (1.96)
Group size	0.258** (4.95)	0.232** (4.35)	0.215** (4.07)	0.157** (2.98)
Sq. of Group size	-0.009** (4.27)	-0.008** (4.06)	-0.008** (3.93)	-0.006** (2.95)
(ECE - none omitted)				
ECE – college diploma	0.841** (5.34)	0.833** (5.32)	0.688** (4.30)	0.725** (4.82)
ECE – post-college cert.	0.589** (2.28)	0.538** (2.10)	0.374 (1.46)	0.454* (1.85)
ECE – university degree	0.561* (1.95)	0.503* (1.76)	0.452 (1.59)	0.472* (1.73)
(Commercial omitted)				
Non-profit status	0.351** (2.78)	0.223* (1.68)	-0.057 (0.38)	-0.088 (0.61)
Constant	1.656** (4.26)	0.220 (0.31)	0.228 (0.31)	-2.085** (2.46)

Teacher Variables				
Female		0.820 (1.62)	0.660 (1.32)	0.581 (1.20)
Has spouse/partner		0.009 (0.07)	-0.020 (0.17)	-0.078 (0.68)
Teacher or Supervisor (assistant teacher omitted)		-0.078 (0.40)	-0.116 (0.59)	0.025 (0.13)
Received professional development training in last year		0.256* (1.87)	0.180 (1.31)	0.221* (1.68)
Teacher's years of job experience in centre		0.017 (1.26)	0.003 (0.18)	0.008 (0.56)
Centre Variables				

Centre Variables				
Director's education (high school graduation or less omitted)				
College Diploma or Certificate		0.586** (2.87)	0.558** (2.75)	0.527** (2.67)
Post-college certificate		0.477 (1.63)	0.397 (1.37)	0.393 (1.40)
B.A. or greater		0.508** (2.27)	0.473** (2.12)	0.459** (2.12)
Director's years of job experience in centre		-0.014 (1.57)	-0.012 (1.32)	-0.009 (1.08)
Number of full-time staff		0.027* (1.84)	0.034** (2.34)	0.034** (2.41)
Child Variables				
Percent of children in centre receiving income-related subsidy		0.005** (2.68)	0.004** (2.05)	0.002 (1.22)
Infant (0-18 mo) classroom	-0.307 (1.30)	-0.371 (1.57)	-0.397* (1.69)	-0.358 (1.57)
Mixed infant-toddler classroom	0.374* (1.82)	-0.417** (2.00)	0.526** (2.54)	-0.462** (2.31)
Toddler (18 – 35 mo) classroom	-0.189 (1.10)	-0.222 (1.28)	-0.250 (1.47)	-0.248 (1.50)

<i>Proxies for unobservables</i>				
<i>Resource Variables</i>				
Subsidized or free rent/utilities			0.260* (1.93)	0.237* (1.82)
Percent of revenues from wage and operating grants			0.005 (1.23)	0.010** (2.70)
<i>Teacher Ability/Effort Variables</i>				
Teacher supervises practicum students			0.068 (0.56)	
Teacher received wage increase in last two years			0.131 (1.12)	
Gross wage per hour - observed teacher			0.047** (2.67)	
Predicted Teacher Sensitivity				0.102** (4.96)
Number of observations	325	325	325	325
Explanatory variables	12	23	28	26
Adjusted R-squared	.198	.240	.271	.309

How big are the effects?

- ◆ ITERS/ECERS are measured on scale of 1 to 7; mean of 4.61; standard deviation of 1.12
- ◆ Improvements in staff-child ratio from 2/10 to 3/10 improve quality by about 0.14; max at 1:1
- ◆ Increases in group size from 10 to 12 increase quality by about 0.05 points; max at 13, then negative
- ◆ Increase in caregiver training from less than one year ECE to college diploma increases quality by 12% (.725). Further ECE does not add.

How big are the effects? (2)

- ◆ Non-profit: no effect (?)
- ◆ Professional development : 3.7%
- ◆ Job experience: no effect
- ◆ College diploma for director: 9%
- ◆ Director's job experience: no effect
- ◆ Mixed age groups: (-8%)
- ◆ Subsidized rent/utilities: 4%
- ◆ Operating grants: .17% per %
- ◆ Wages: .8% per dollar/hr.
- ◆ Teacher sensitivity: 1.7% per unit

What does a centre fixed-effects model do?

- ◆ Inserts a dummy variable for every centre in data set (eliminates all other centre-specific variables from estimation)
- ◆ Estimates are therefore based only on the quality variations between rooms within the same centre (between-centre quality differences are captured by centre dummies)

Why a fixed-effects model?

- ◆ There may be unobserved centre-specific contributors to quality that are correlated with structural factors (e.g., enthusiasm and leadership of director)
- ◆ Omitting between-centre quality variations still leaves within-centre quality variations and these should be affected by differences in structural features between classrooms in same centre

Is fixed-effects persuasive?

- ◆ Centre fixed-effect is leadership of director, resources of centre, character of families using centre
- ◆ Correlated with higher staff-child ratio, lower group size, higher staff education
- ◆ Requires systematic misperception of what produces quality

What's wrong with using within-centre variation?

- ◆ Rooms serve different ages
- ◆ Directors are unlikely to permit substantial quality variations between classrooms – largely measurement error
- ◆ Directors are likely to use unobserved resources to compensate for differences in staff-child ratio, group size and education that would otherwise create quality differences
- ◆ Finding of “no effect” in a fixed-effects model means directors are doing their jobs, not that structural features have no impact on quality

Conclusions

- ◆ Policy-relevant inputs matter: s/c ratio, group size, ECE affect quality; some effects are non-linear; non-profit status has no independent effect
- ◆ Director's education, centre resources and unobserved teacher effort/abilities are important
- ◆ centre fixed-effects model not useful

Problems and further work

- ◆ Is there heterogeneity in objectives amongst centres? Control for type.
- ◆ Provincial fixed-effects?
- ◆ Infants-toddlers vs. preschoolers
- ◆ Education of secondary staff
- ◆ How good a predictor is structural quality?
- ◆ Sensitivity, Harshness, Detachment
- ◆ CQCO, ELDEQ, non-profit
- ◆ Simplify staff-child, group size

The End

