

Access, quality, and developmental trajectories:

*Rethinking how structural inequalities relate to Early Childhood Education
in longitudinal research and educational policymaking*

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Introduction

- Quantitative research is prominent in evidence-led policy making
- Conceptual models travel from research into policy
 - So conceptual models used in quantitative research need scrutiny
- A recurring problem: split narratives about inequality
 - in child outcomes vs access to services
- Today's focus: ECE research & policymaking
- Today's offer: a practical alternative conceptual model that integrates these split narratives
- Note: the split appears beyond ECE (child dev, health, education)



Contents

1. How current conceptual models commonly link: backgrounds, child development, and Early Childhood Education (ECE)
2. Where did these conceptual models come from?
3. Why do these models persist?
4. An integrated conceptual model
5. Evidence illustrations (EPPE, FCCC)
6. Implications for research & policy

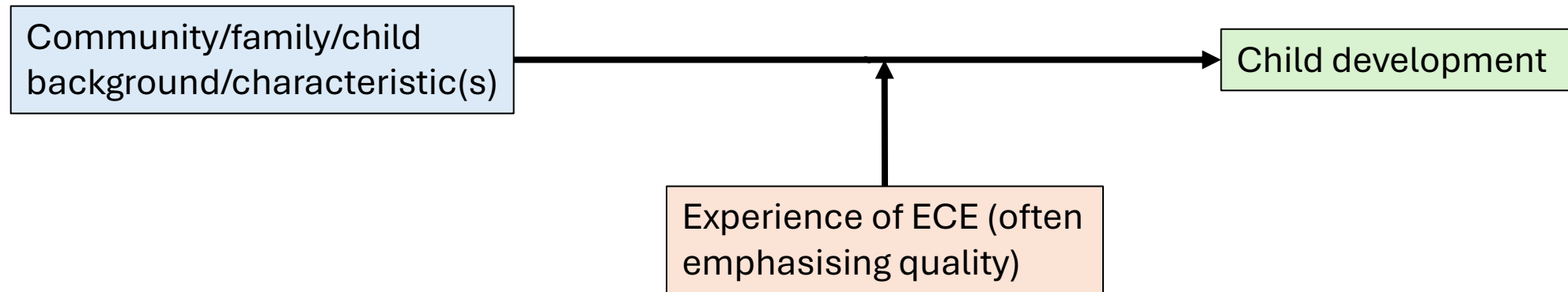


1. How current conceptual models commonly link: backgrounds, child development, and Early Childhood Education (ECE)



1. **How current conceptual models commonly link: backgrounds, child development, and Early Childhood Education (ECE)**
2. What's missing: integrated representations of inequality
3. Why do these models persist?
4. An integrated conceptual model
5. Evidence illustrations (EPPE, FCCC)
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Conceptual Model 1: ECE as a ‘moderator’ of the relationship between backgrounds and child development



- Structural inequalities in child development are conceived to shrink with ECE quality
- Structural inequalities in access to high-quality ECE are ignored/removed in this narrative

• Example within current ECE research:

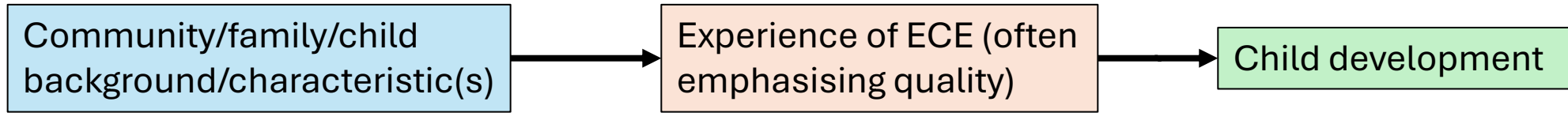
- Schmutz, R. (2024). Is universal early childhood education and care an equalizer? A systematic review and meta-analysis of evidence. *Research in Social Stratification & Mobility*
- “Universal ECEC is an effective policy strategy for equalization.”
- “Disadvantaged children benefit from ECEC throughout their lives.”
- “Low SES children benefit more in the non-cognitive domain than high SES children.”

• Example within current ECE policy:

- OECD (2025). *Reducing inequalities by investing in early childhood education and care. (Starting Strong VIII)*.
- “For early childhood education and care policies (ECEC) to mitigate inequalities, two conditions need to be met: i) ECEC has positive effects on some areas of children’s development with implications for their education and labour market outcomes, as well on their success in life more generally; and ii) positive effects are greater for vulnerable children than for others.” (p.193)

Conceptual Model 2:

Inequalities in access to ECE foster developmental differences



- Used in narratives explaining structural inequalities in access to ECE and/or to access to higher quality ECE
- Structural inequalities in child development are often ignored, or simplified
- This conceptual model can also often be found reduced to a pair of two-concept relationships (background to ECE; ECE to child development).

Example within current ECE research:

- Hermes et al., (2025). Application barriers & the socioeconomic gap in child care enrollment. *Journal of the European Economic Association*
- “Why are children with lower socioeconomic status (SES) substantially less likely to be enrolled in child care?”
- We study whether barriers in the application process work against lower-SES children -- the group known to benefit strongest from child care enrollment.”
- “We find substantial, equity-enhancing effects of the treatment, closing half of the large SES gap in child care enrollment.”

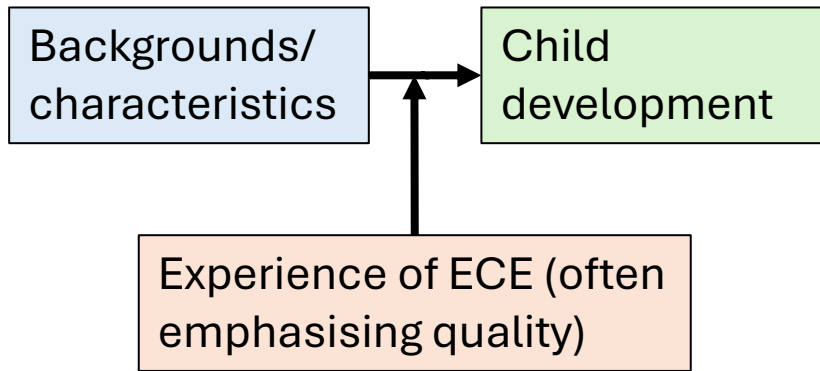
Example within current ECE policy:

- The Sutton Trust. (2024). *Inequality in early years education*
- “There is a substantial gap in development between the poorest children and their better off peers before they start at school. The early years are crucial to narrowing this gap. However, the existing system in England provides less time in early education and care to the children from low-income families who stand to benefit the most.”

Artificially disconnected narratives on inequalities?

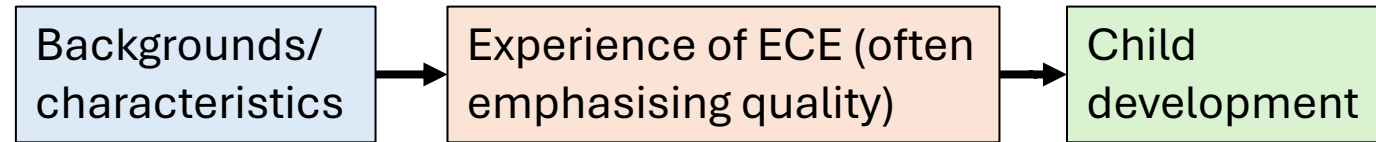
Conceptual Model 1:

ECE for structural inequalities in child development



Conceptual Model 2:

Structural inequalities in access to ECE



- Neither conceptual model is wrong -- each is used within different narratives of structural inequalities
- Are we missing opportunities to reduce structural inequalities by persisting with this approach though?
- Where did these conceptual models come from, and why have they seen no integration yet?
- Could these conceptual models be integrated, and if so, with what implications for research and policy making?

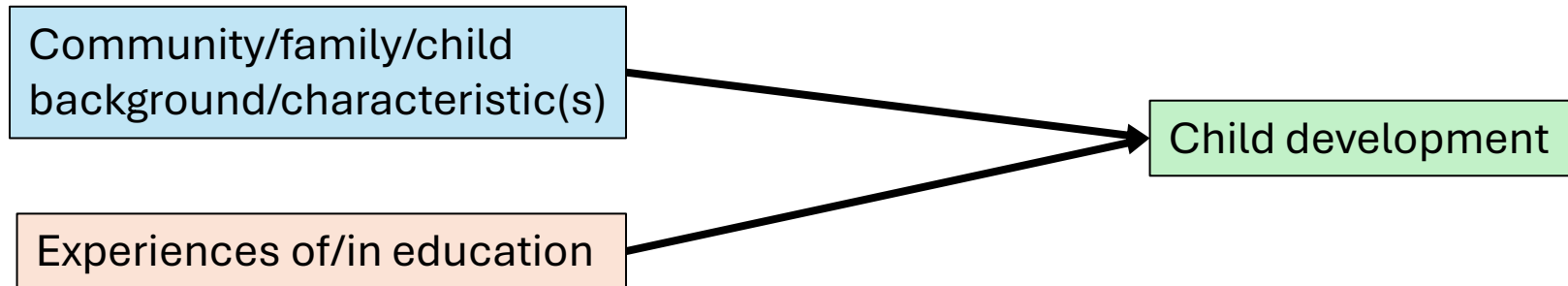
2. Where did these conceptual models come from?



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Within Education research – a common starting point: The Coleman Report (1966)

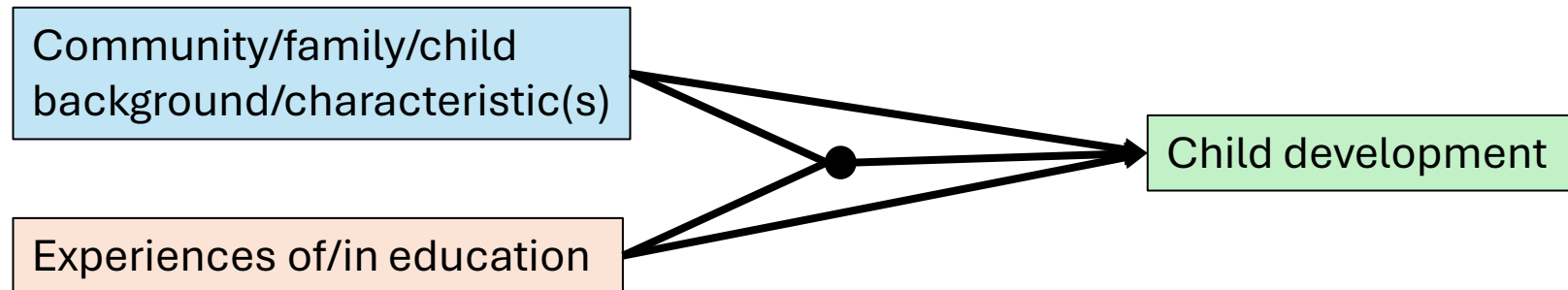
- Not ECE-focused, but education focused more broadly
- Carries within it a conceptual model that conceives of educational experiences as independent from backgrounds, but with both having effects on child development (with background effects being bigger):



- Provides a common starting point for both conceptual models

Development of Conceptual Model 1: From competing effects to interacting effects: School Effectiveness Research 1970s-1990s

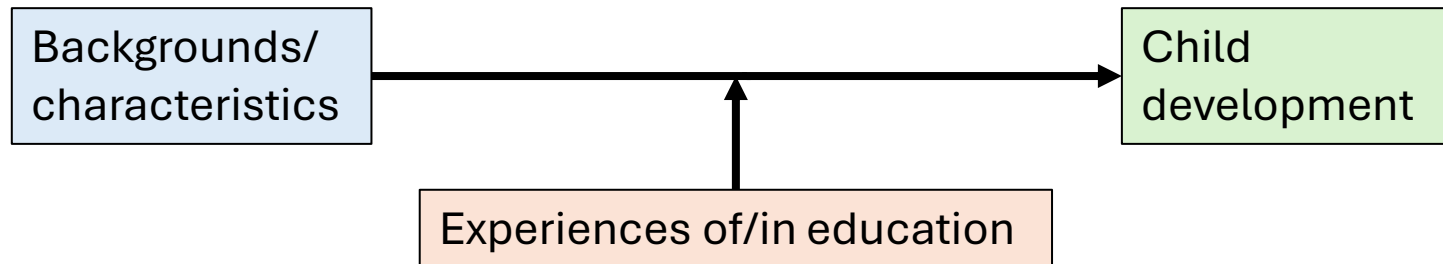
- Again focused on all of education, not just ECE
- School Effectiveness Research re-asserted that education mattered to child development above and beyond background characteristics
- Routine empirical testing of ‘interactions’ (e.g., background × classroom quality).



- The idea of interaction still remains common in conceptual models – but it is very rarely illustrated. (This illustration is an exception -- adopted from Muthén & Muthén, 1998-2017).
- No simultaneous modelling of structural inequalities in access to education
 - Speculation: Because of the limits for operationalising such a model with statistics?
- Example from ECE: Reid & Ready (2013). High-quality preschool: The socioeconomic composition of preschool classrooms and children’s learning. *Early Education and Development*
 - “For expressive language, the results indicate that socioeconomic composition and instructional quality interacted to promote children’s learning ...”

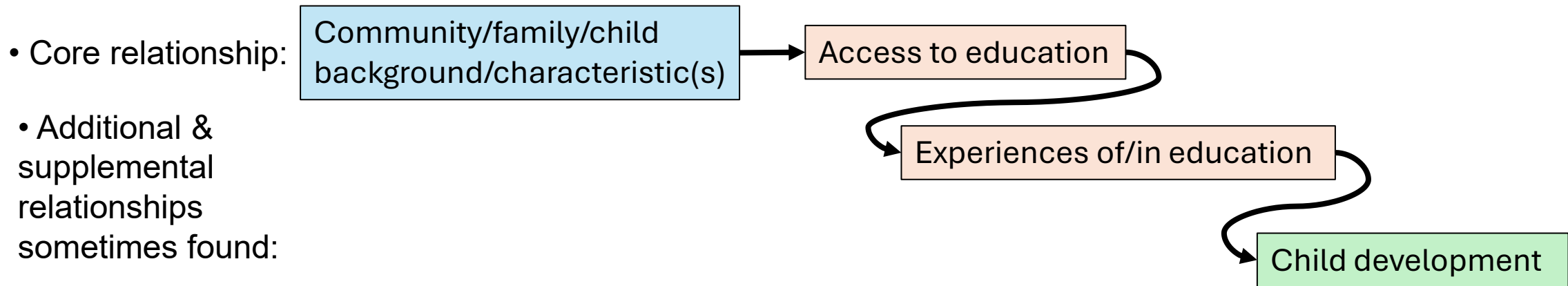
Development of Conceptual Model 1: From interacting effects to moderating effects: An import from psychology (2000s – present day)

- Again focused on all of education, not just ECE
- The concept of moderation spreads throughout many research fields from the 1980s onwards (e.g. Baron & Kenny, 1986).
- Moderation is a directional concept, and so allows for more directional conceptual models than possible when using the directionless concept of interaction



- No simultaneous modelling of structural inequalities in access to education
 - Speculation: Because of the limits for operationalising such a model with statistics? (keeping in mind that many of the statistical operationalisations of moderation and interaction are the same)
- ECE example: Hall et al. (2013). Can preschool protect young children's cognitive and social development? Variation by center quality and duration of attendance. *School Effectiveness and School Improvement*
 - “...the 13 measures of quality were independently examined to determine whether each could significantly moderate the effects of either of the two combined risks (child-level, family-level) as they impacted each of the three measures of age 5 development.”

Development of Conceptual Model 2: Chaining together two-concept relationships



- Once beyond the core two-concept relationship, the inclusion of additional relationships is increasingly uncommon as more relationships are considered.
 - The relationship between experiences of/in education and child development, where included, is often treated with either a lack of specificity or with homogeneity
 - With more concepts featuring in the model, there are often also unrealised opportunities to conceive of 'indirect effects' – in other structural inequalities in child development due to earlier structural inequalities in access to education and/or experiences of/in education

3. Why do these models persist?



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Why do these two conceptual models persist – though they feature the same concepts?

- There is value from adhering to established systems of knowledge acquisition and communication – especially when working at the interface of research and policy making.
- E.g.#1: Separate narratives are accepted on structural inequalities in accessing ECE (1) and ECE's potential to alter structural inequalities in child development (2).
 - (Narratives such as “quality works”; “access is unequal”)
- E.g.#2: Shared knowledge and trust in research methodology needs to be established across the interface between research and policy making.
 - (Such as the use of statistical product terms when operationalizing conceptual model 1. They have been used for 50+ years)

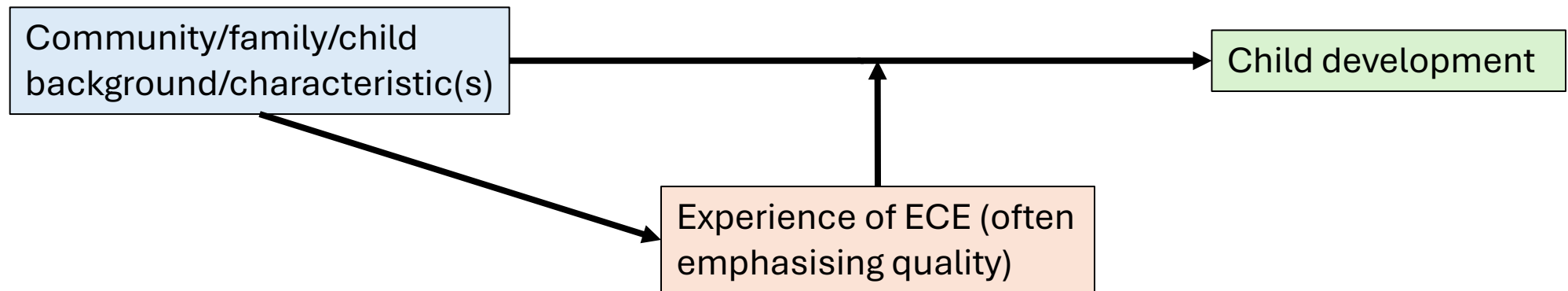
4. An integrated conceptual model



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An integrated conceptual model

- ECE as an ‘airbag moderator’ of the relationship between backgrounds and child development (Hall, Malmberg, Lindorff, Baumann, & Sammons, 2020)

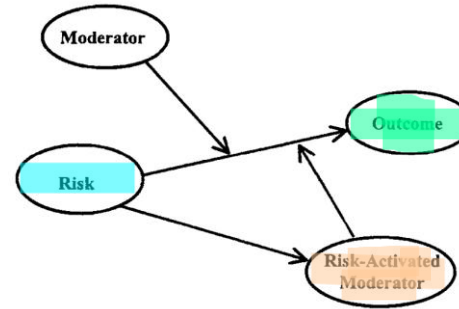


- Structural inequalities in access to higher-quality ECE are inextricably linked to structural inequalities in child development
 - The same backgrounds/characteristics linked to structural inequalities in child development can also be linked to structural inequalities in accessing experiences in ECE that can foster or hinder these developmental inequalities.

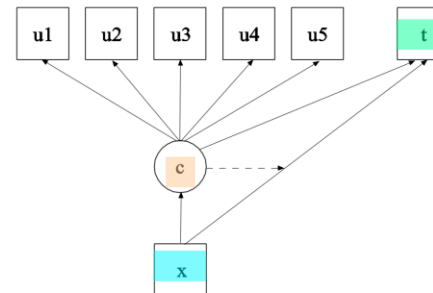
Where did this idea come from?

- Variously hinted at by several well-known academics, and in different places, over the years – but with none of these ideas having ever been brought together, unified and taken forwards:

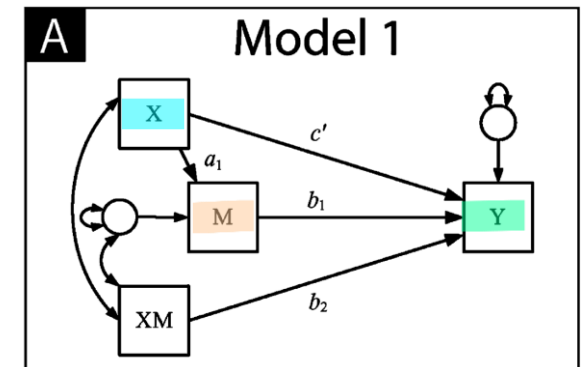
1. Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*



2. Preacher, K. J., Rucker, D. D. and Hayes, A. F. (2007) illustrating an idea from James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*



3. Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.).

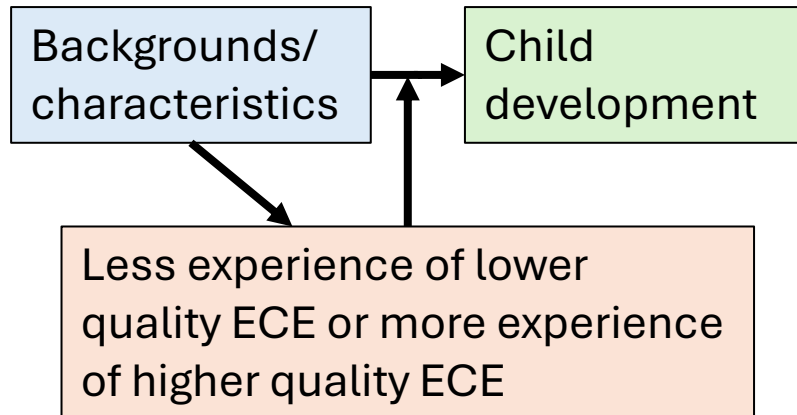


Airbag Moderation in ECE (what it means in practice)

- Can be used to explain multiple types of not just structural inequality, but also equity.
- Who gets what, and how much of it in ECE? (Hall et al., 2024). Understanding that:
 - Experiences of higher quality ECE **can** lessen structural inequalities in child development
 - Experiences of lower quality ECE **can** worsen structural inequalities in child development

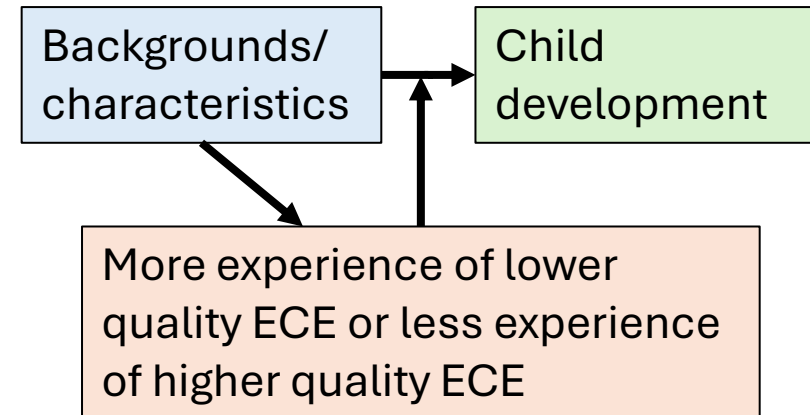
Integrated Conceptual Model a:

ECE lessening structural inequalities/inequities



Integrated Conceptual Model b:

ECE worsening structural inequalities/inequities



- Both of the arrows going to and from the orange boxes are crucial to understand – in combination – to fully understand how ECE contributes to structural inequalities in child development

Where policy acts in this picture

- For reducing structural inequalities and fostering equity in child development, the integrated conceptual model shows that there are two levers:
 1. Change who gets what -- places, fees, hours, transport, information
 2. Change the nature of the experienced ECE -- pedagogy, training, ratios, workforce
- The integrated conceptual model helps policy makers to understand *which* lever matters: sometimes it's access bottlenecks, sometimes it's practice quality. Often its both.

5. Evidence illustrations (EPPE, FCCC)



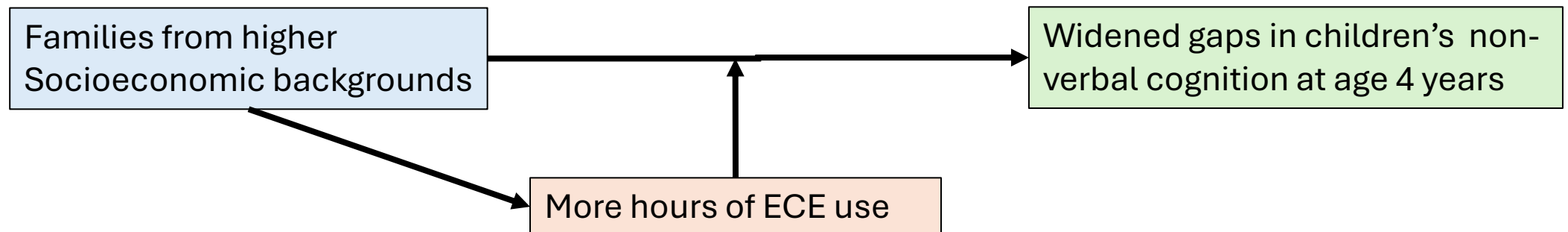
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Using the integrated conceptual model in empirical research

- Airbag Moderation provides researchers with the conceptual model --- and the accompanying analytic tools -- that they need to start producing understandings of ECE's contributions to structural inequalities that much more closely captures what happens in the real-world.
 - It is now just a matter of application.
- A showcase of the new conceptual model in empirical application with existing ECE data showcases the utility of the model towards rethinking:
 1. How structural inequalities in child development relate to ECE
 2. How we can advance research knowledge in this area

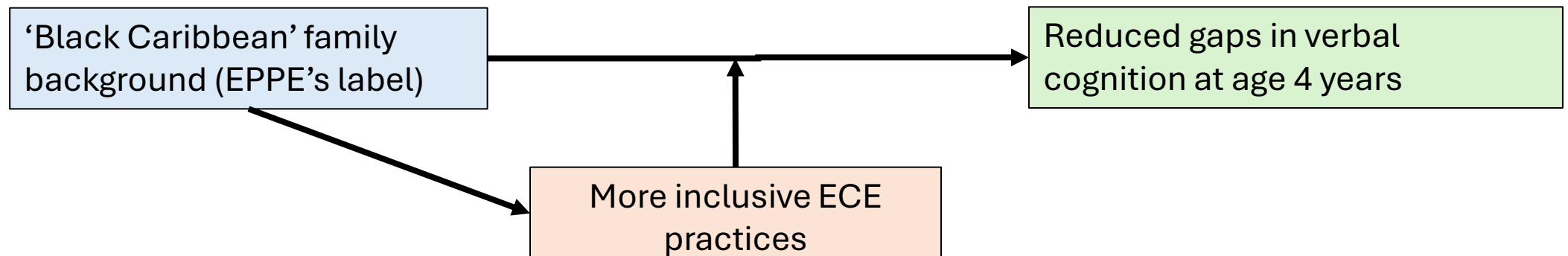
Using the integrated conceptual model with data from the FCCC study

- Families, Children, and Child Care (FCCC) study (see Sylva et al., 2007)
 - Publicly accessible data: <http://www.familieschildrenchildcare.org/>
 - A prospective longitudinal study of 1,201 UK children from birth to school-entry
 - (Integrated conceptual model operationalised using the 'latent random coefficient' method described by Hall et al (2020).)
- Families from higher socioeconomic backgrounds were likely to use ECE for more hours, and this greater usage of ECE was found to widen socioeconomic gaps in age 4 non-verbal cognition



Using the integrated conceptual model with data from the EPPE project

- Effective Provision of Preschool Education (EPPE) project (see Sylva et al., 2004)
 - Publicly accessible data:
<https://datacatalogue.ukdataservice.ac.uk/studies/study/7540#details>
 - A prospective longitudinal study of 3171 UK children from 3 years to adulthood
 - (Integrated conceptual model operationalised using the 'latent random coefficient' method described by Hall et al (2020).)
- Families from 'Black Caribbean' backgrounds were more likely to use centre-based ECE characterised by more inclusive ECE practices, and attending such an ECE setting was found to reduce ethnicity gaps in age 4 verbal cognition



6. Implications for research & policy



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Why this matters

- From a purely pragmatic standpoint: How quantitative research frames the effects of ECE upon child development shapes how policy makers then frame these effects – with direct consequence for what then happens in ECE settings.
 - Policy, research, and practice are in constant two-way communication



- Omitting understandings of selection effects -- from research, policy, and/or practice – yields partial understandings and blunts levers that stops ECE from achieving its potential.
- Using an integrated conceptual model improves understanding of structural inequalities in ECE and child development and fosters policies that effective in supporting equity.

Thank You

- Questions and Comments?
 - *What access or practice lever would you move first -- and why?*

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- Take the integrated conceptual model forward? Core papers:

Hall, J., Malmberg, L. E., Lindorff, A., Baumann, N., & Sammons, P. (2020). Airbag moderation: the definition and statistical implementation of a new methodological model. *International Journal of Research & Method in Education*, 43(4), 379-394. <https://doi.org/10.1080/1743727X.2020.1735334>

Hall, J., Palardy, G., & Malmberg, L-E. (2024). Selection effects in education and implications for educational opportunity: State of the field and future directions. *School Effectiveness and School Improvement*, 35(3), 298–317. <https://doi.org/10.1080/09243453.2024.2385934>

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