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Towards Greater Equity Among Young Learners in Singapore



In Singapore, what potential interventions focused on primary-school aged children may work best in addressing socio-economic disadvantage in education ?

Our research addressed three questions



Identifying whether the SES disadvantage gap in education in Singapore appears as early as primary school or before it, and potential determinants of this gap



Describing the global evidence base for interventions at the primary school stage



Understanding the context and support for likely approaches in Singapore

Local Evidence Review

How do we capture socioeconomic status?

“SES can be defined broadly as one’s access to financial, social, cultural and human capital resources”

Cowan, C. D., Hauser, R. M., Levin, H. M., Beale Spencer, M., & Chapman, C. (2012). Improving the measurement of socioeconomic status for the National Assessment of Educational Progress: A theoretical foundation

- Most common measures relate to material / structural factors captured by the “Big Three” : education, occupation and household income
- Expanded measures typically reflect
 - More levels of access (e.g. community or neighbourhood-level wealth)
 - Broader dimensions (e.g. individual or family status and social class)
 - Include context-specific aspects (e.g. types of resources for a purpose)

For example: The Programme for International Student Assessment (PISA) economic, social and cultural status (ESCS) composite is based on parents’ education and occupation as well as general household assets such as possession of a car but also a room or space to work, access to the Internet, the number of books and other educational resources

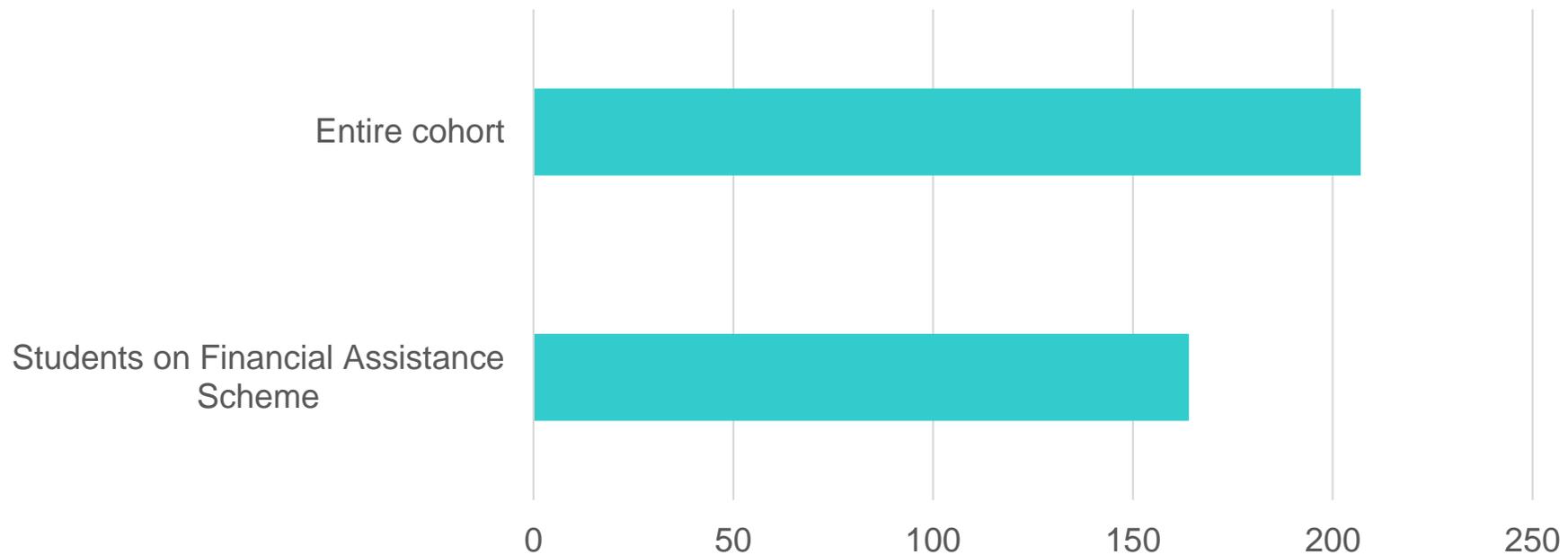
- Common measures / proxies are used in Singapore, for example
 - Housing type
 - For students, qualifying for FAS (from 1 January 2023, Singapore Citizen students from households with gross monthly household income (GHI) < \$3,000 or per capita income < \$750)



Are SES effects seen at the end of primary?

Yes

Approximate median PSLE score 2011-2020



June 2021 Parliamentary Question "to ask the Minister for Education (a) in each year from 2011 to 2020, what are the median T-scores of students who sat for the PSLE, broken down by household income quintile; and (b) whether school closures due to COVID-19 disproportionately impacted the academic performance of children from lower income households"
Response: "MOE does not collect data on household income of students, except for Singapore citizen students who apply for the MOE Financial Assistance Scheme (FAS), where the income criterion is set at about the bottom quintile of the national household income.... Over the past decade, including for 2020, their median PSLE T-score has been stable at around 164. Likewise, the median PSLE T-score of the entire PSLE cohort has remained stable at around 207 over the past decade."

Are SES effects seen in mid-primary?

Yes

- The Trends in International Mathematics and Science Study is a global assessment conducted every 4 years on a nationally representative sample of students aged 9-10, organized by the International Association for the Evaluation of Educational Achievement
- TIMSS provides information not just about student knowledge and skills in mathematics and science, but also outcomes, such as the students' attitudes toward learning the subjects and information on student household characteristics that allows the computation of an SES index similar to PISA*

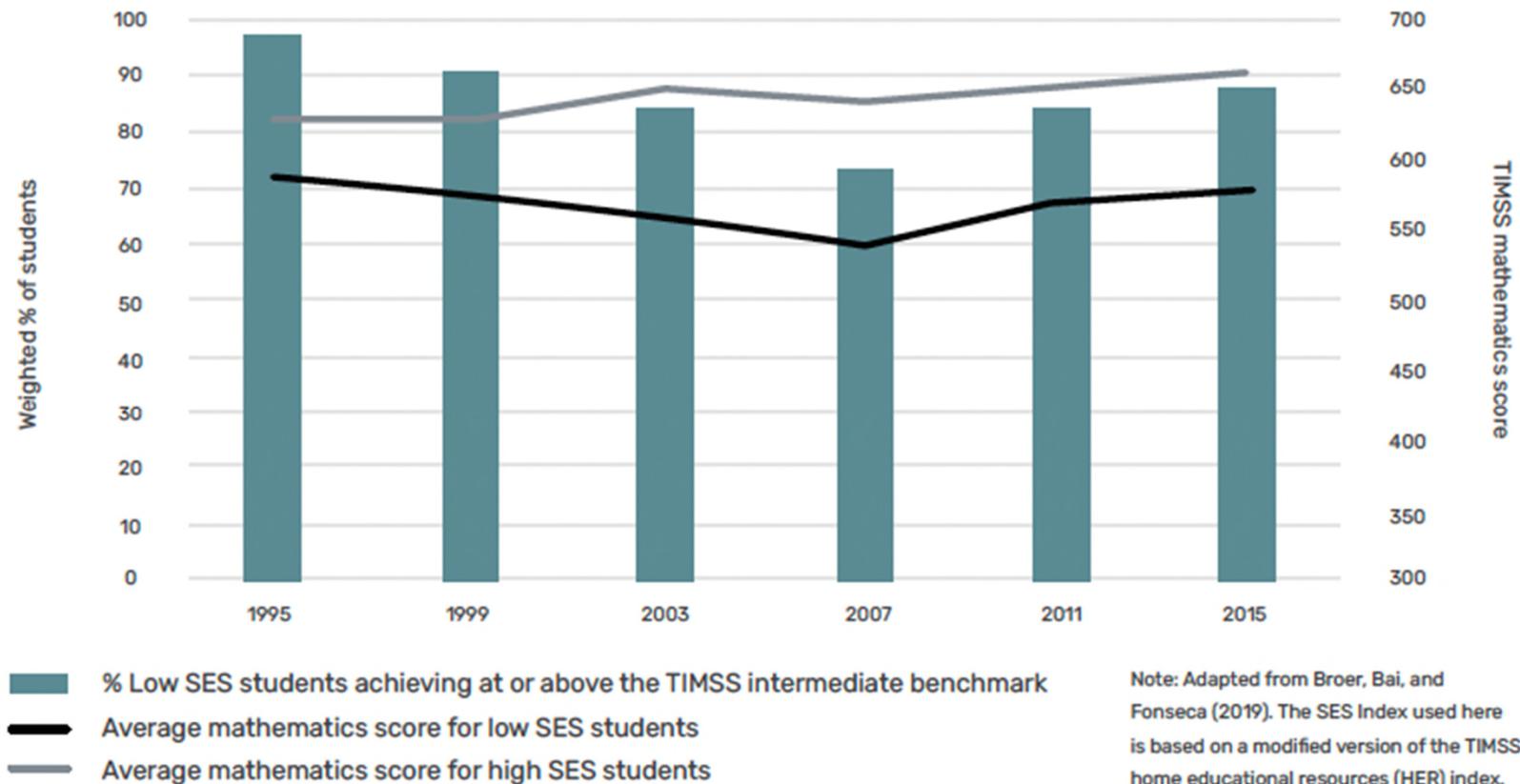
In 2019: Singapore continues to have one of the highest proportions of students who attained the top two international benchmarks ("Advanced" and "High") among participating education systems, in both Mathematics and Science. At least 7 in 10 of our students attained these two top benchmarks at each grade and subject (P4: Maths 84%, Science 74%; S2: Maths 79%, Science 77%)....The proportions of our P4 and S2 students who did not manage to attain the lowest ("Low") international benchmark have remained very small, at between 1% and 2% for both subjects (International medians: 8%-15%)

All our students have done well by international standards, not just those who are academically stronger. In particular, our students who are academically weaker achieved scores that are among the highest across all participating systems

Are SES effects seen in mid-primary ?

Yes

Achievement Gaps in Singapore, TIMSS1995-2015



Are there roots in pre-primary years?

Yes

- Singapore Longitudinal Early Development Study
 - 5,000 children and their primary caregivers representing Singapore resident households with children under 7 years old
 - Supported by the NUS Centre for Family and Population Research (CFPR)
- Both achievement and socioemotional skills are associated with SES at young ages even before primary
 - For kindergarten age children (4-6), those in the lowest income quartile scored lower in age-appropriate numeracy and verbal tests than peers in the highest quartile, and those whose parents are least educated scored lower than their peers whose parents had a university degree.
 - Delay of gratification scores are also significantly associated with parental education and housing, starting in kindergarten and continuing into primary

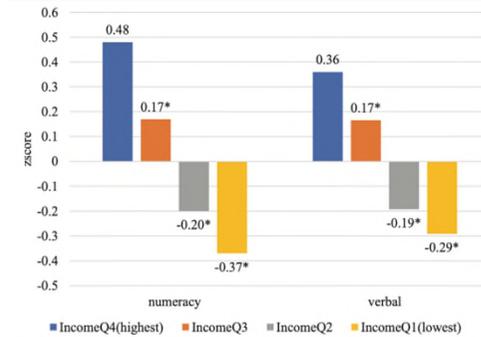


Figure 1a. Achievement by Income Quartile
* denotes that the gap between the group and income Q4 is significant at 0.05 level.

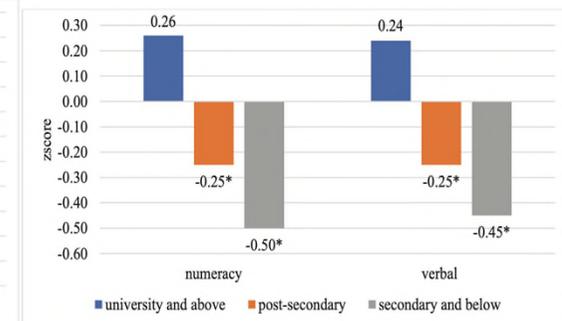
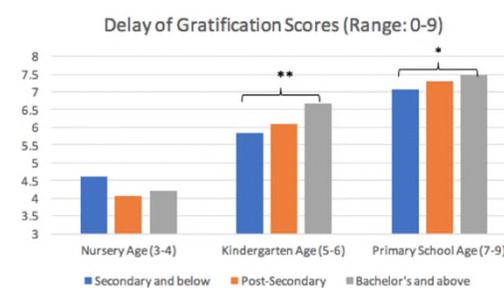
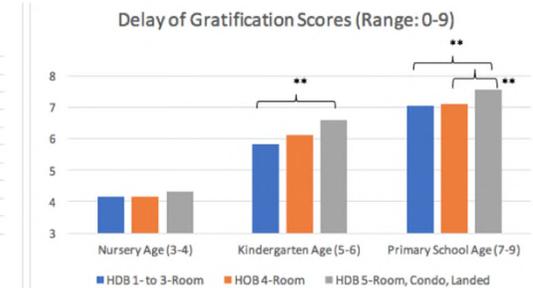


Figure 1b. Achievement by Parental Education
* denotes that the gap between the group and university and above is significant at 0.05 level.

Yeung, Jean and Chen, Xuejiao "Achievement Gaps before School in Singapore: Family Socioeconomic Status, Parenting and Delay of Gratification" SGLEADS Research Brief Issue June 2021



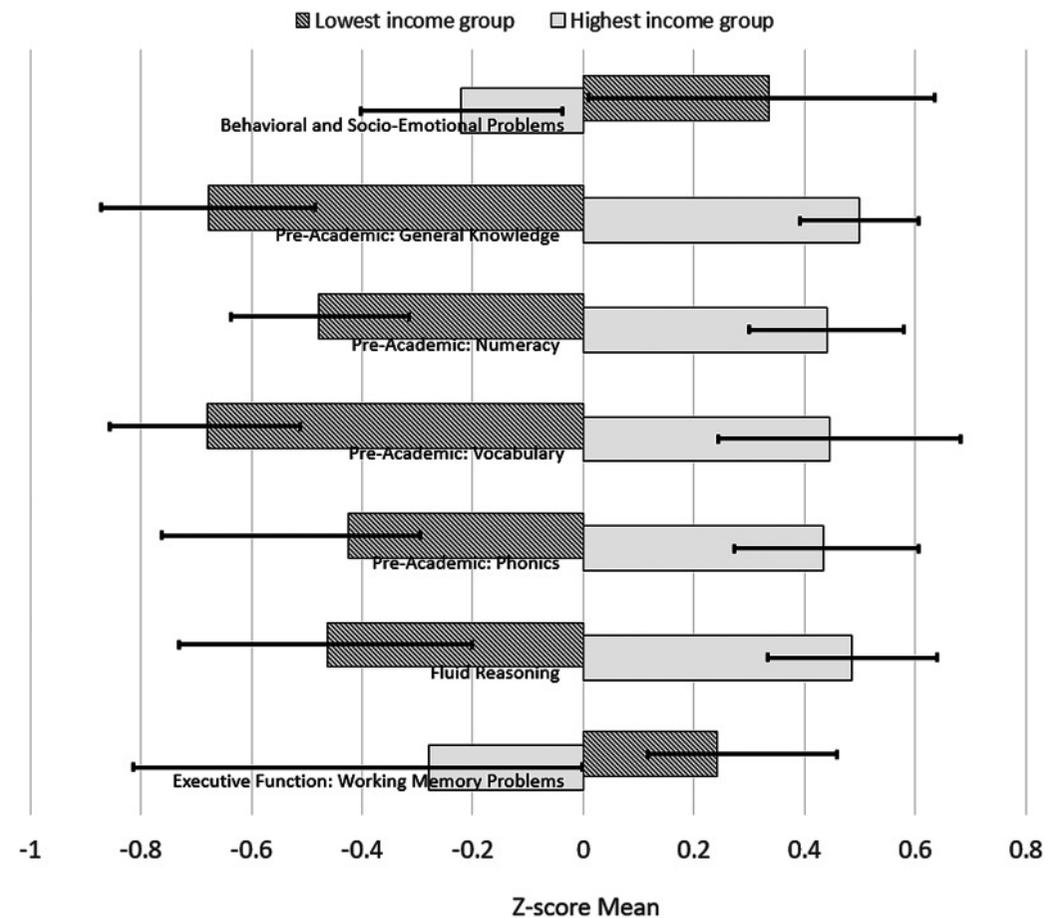
Yeung, Jean "Selected Findings from the SG LEADS Relevant to Maternal and Child Health" Presentation to Health Promotion Board, Sept 20 .2021



Are the roots in pre-primary years?

Yes

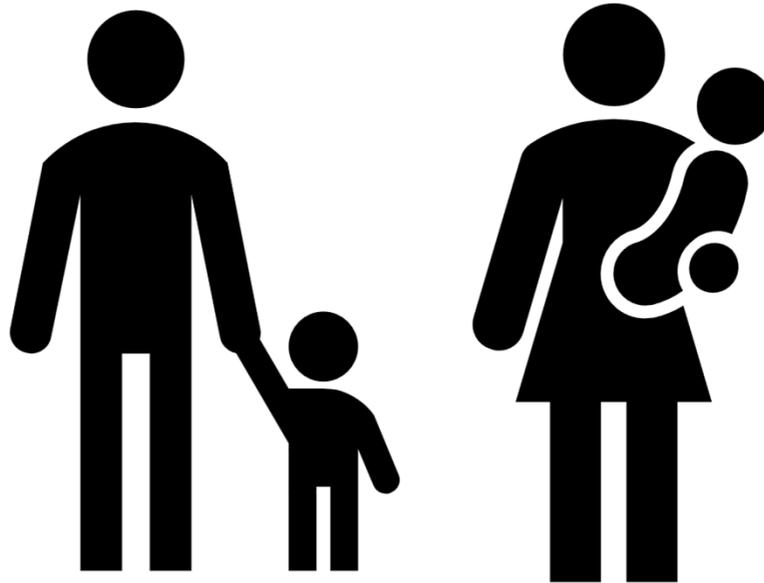
- Growing Up in Singapore Towards Healthier Outcomes (GUSTO)
 - Birth cohort of 1200 Singaporean women studied throughout their pregnancies and after they gave birth in 2009-2010
- GUSTO also shows achievement and socioemotional skills are associated with SES even before primary
 - Preschool age children in the lowest income group scored lower on measures of pre-academic achievement, general knowledge and vocabulary than children in the highest income group
 - They were also more likely to report behavioral and socio emotional problems or working memory problems



How does home environment matter?

SG LEADS analysis of mediating pathways suggests that financial stressors, values, and in particular the strength of the relationship of the child to the father as key contributors to the physical home environment, development activities and socioemotional qualities

GUSTO study has shown that a strong predictor of differences in development outcomes between low and high SES families is maternal mental health



How does social status and class matter?

Yes

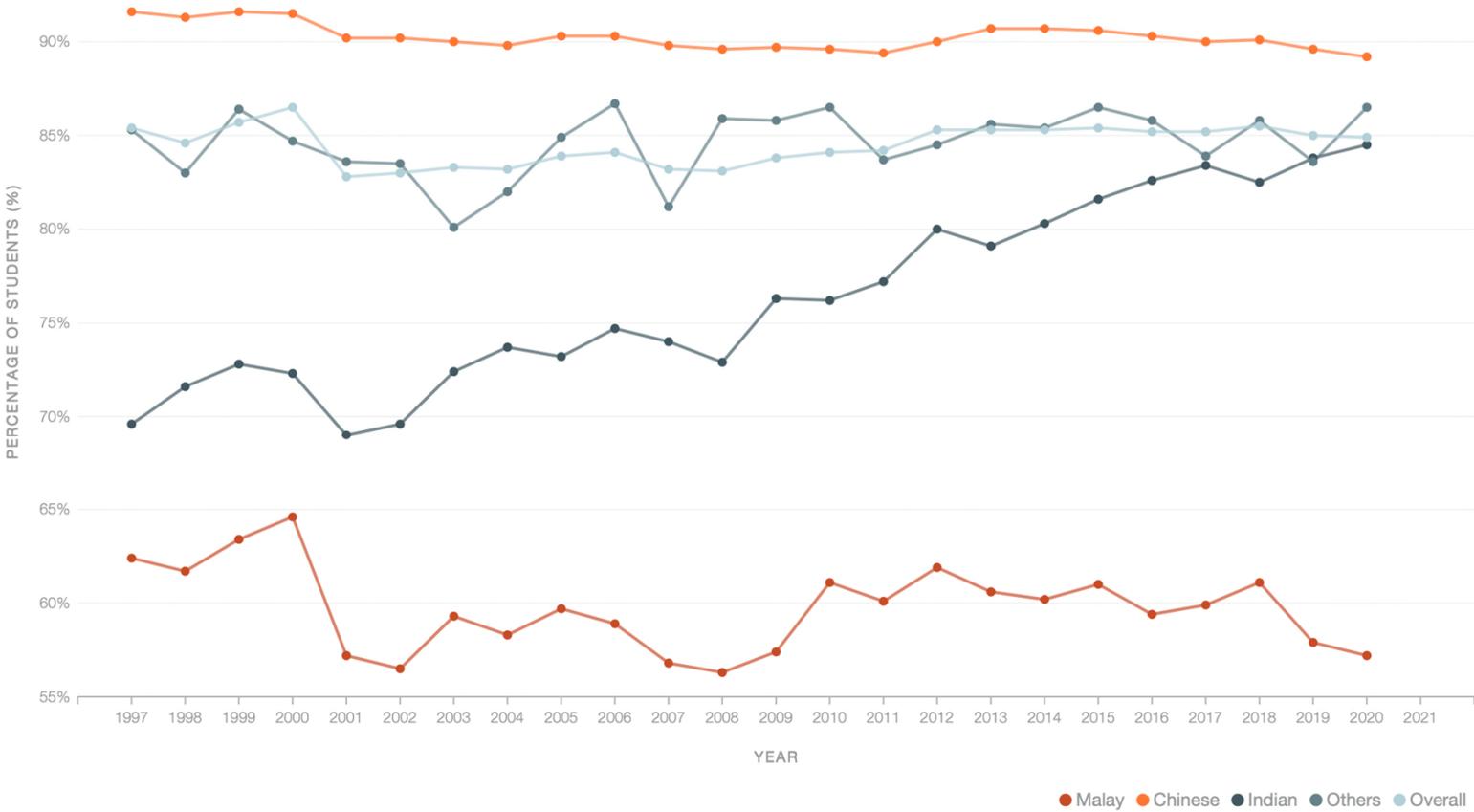
- Using longitudinal data on students from 2004-2010, National Institute of Education authors created a socio-economic (SES) index as a weighted composite of mothers' educational level, type of residence (1-room HDB to Landed property) and SES resources (family has domestic helper, a car, club memberships)
- Material SES has a moderate effect on aggregate PSLE scores, but other individual social factors such as language spoken at home also have large effects
- Independently there are strong positive associations between class-PSLE and class-SES, suggesting that SES of peers also matters and influence individual achievement indirectly through higher PSLE grades



What other implications do we see?

Yes

PSLE Pass Rates (Mathematics)

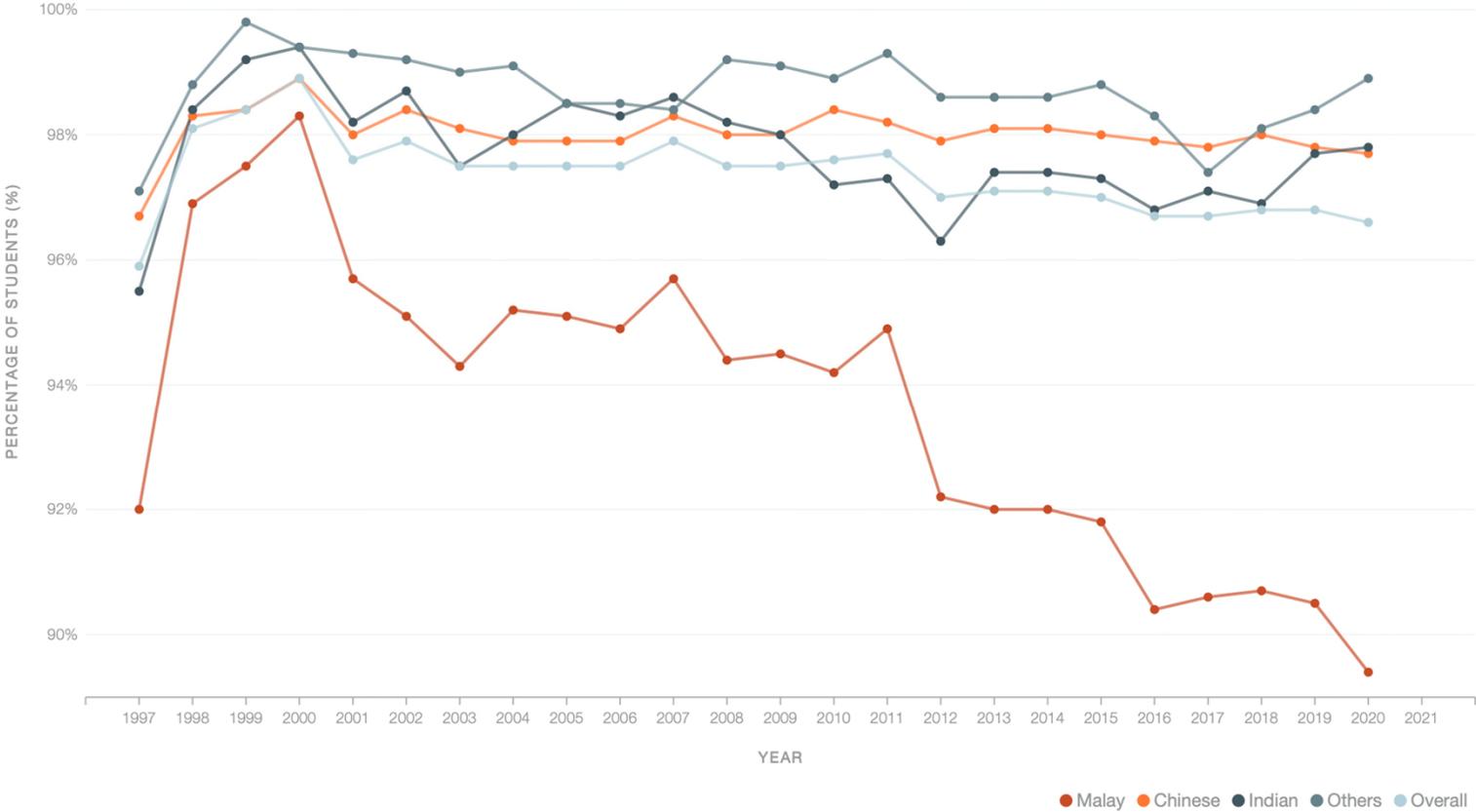


SOURCE: DATA.GOV.SG

What other implications do we see?

Yes

PSLE Pass Rates (English)

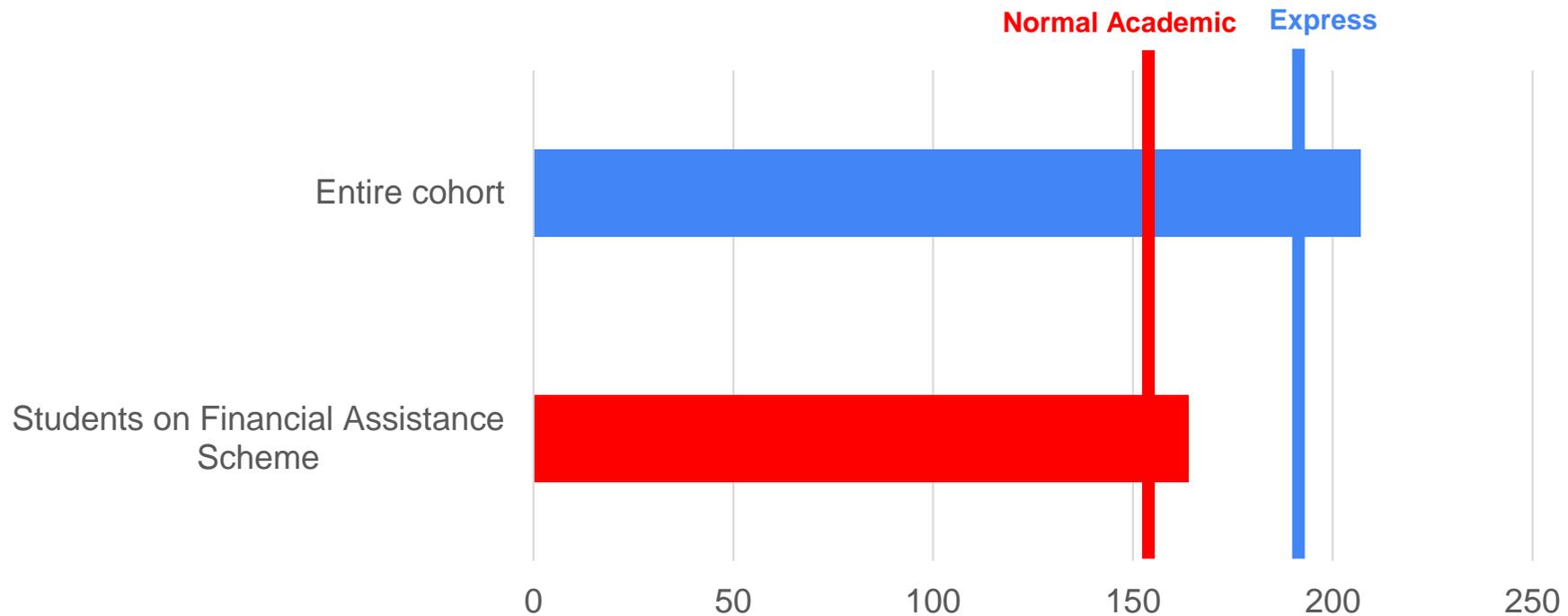


SOURCE: DATA.GOV.SG

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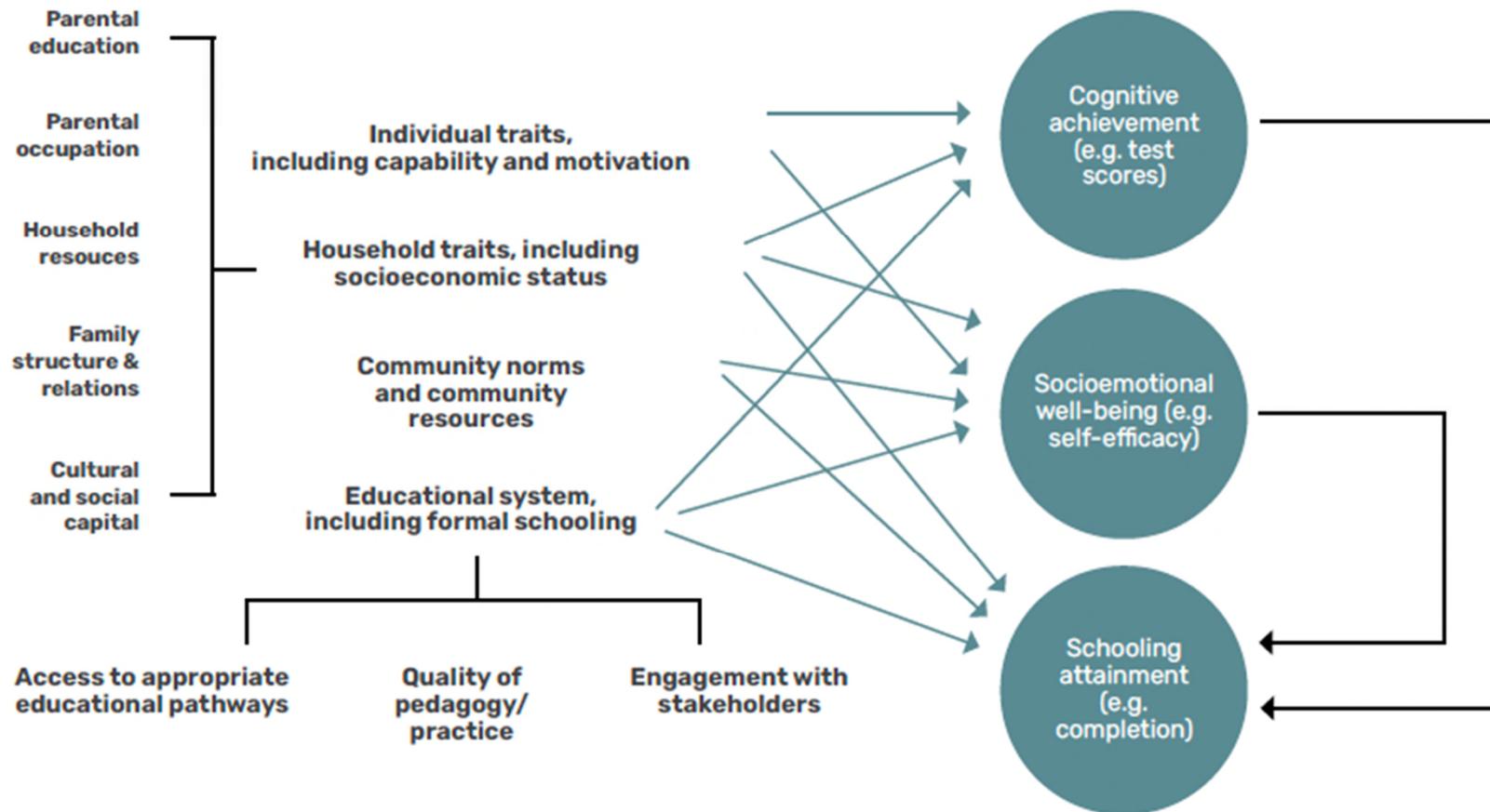
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Global Evidence Review

A framework for interventions and outcomes



Categories of intervention

1. Interventions that enhance or expand the formal education system

- System-level interventions aimed at changing access (e.g., Financial Assistance Scheme from MOE, pedagogies or teaching strategies)
- Programmatic, school-based approaches that target engagement of or support for students and families, such as learning support

2. Interventions outside the education system that target household socioeconomic status directly, including:

- Workfare
- Housing support
- Social safety nets including Comcare

3. Interventions outside the education system that address the capacity, beliefs or resources of students, households or the community related to learning, such as:

- Awareness building
- Broad-based subsidies and targeted assistance for all educational levels
- Training or supplementary education
- Mentoring programs



Rapid evidence review

- Goal: Identify existing programs (and program components/instruments) from outside the education system that aim to improve academic performance of students from disadvantaged backgrounds (low SES)
- Conduct pragmatic rapid review of existing evidence (from 2014 to present) about the effectiveness of these programs from mostly OECD countries
- Provide recommendations on how to put together instruments that can best address academic difficulties of disadvantaged students in Singapore

Search Strategy

- **Primary outcome:** academic achievement/performance
- **Population:** primary school students from a socially disadvantaged / at-risk background in high-income/OECD countries
- **Time frame:** 20 years
- **Initial wide search for systematic reviews and meta-analysis;** Databases and Journals: Campbell Library, Review of Educational Research, American Educational Research Journal, the Journal of Educational Research, Learning and Instruction, and the Journal of Educational Psychology
 - Key resource: Dietrichson, J., Bøg, M., Filges, T., & Klint Jørgensen, A. M. (2017). Academic interventions for elementary and middle school students with low socioeconomic status: A systematic review and meta-analysis. *Review of Educational Research*, 87(2), 243-282.
- **Additional search for observational studies** built on taxonomy of interventions in Dietrichson et al (2017) + hand-screening of interventions in the Education Research Information Center (eric.ed.gov) database

Final synthesis
based on 3
systematic reviews
+ 9 relevant
observational
studies

Information
extracted on
primary outcome
as well as other
outcomes and
elements of
framework

Type of intervention	Component	Definition	Effects on primary outcomes of academic achievement		Other relevant potential effects
Supplementary in-school or other academic support	Tutoring	Highly structured one-on-one or small group pedagogical support	+++	Large positive and significant effects from systematic reviews	Increase interaction with role models and provide positive support and encouragement
	Cooperative learning	Students work in small groups to facilitate mutual learning	++	Moderate positive and significant effects from systematic reviews	Enhance affective skills through relationship formation with peers
	Small group (SG) instruction	Intensive adult-delivered instructions to 2-5 students	++	Moderate positive and significant effects effects from systematic reviews	Increase access to positive support and encouragement

Results from review

Enhancing

Type of intervention	Component	Definition	Effects on primary outcomes of academic achievement		Other relevant potential effects
Enhancements to academic learning	Feedback/progress monitoring	Timely information about student performance	++	Moderate positive and significant effects from systematic reviews	Improve self-regulative behaviour
	Computer-assisted instruction (CAI)	Use of computer systems or computer software inside the classroom with or without trained supervision	++/-	No significant effects from systematic reviews; wide range of positive to negative effect sizes in individual studies	Increase time engaged in homework and independent learning, as well as encourage parental engagement with their child's learning
	Incentives	Reward and/or condition performance-enhancing behaviours	+	Limited/no significant effects from systematic reviews; time-limited effects in individual studies	Create group motivation effects to improve school performance

Results from review

Complementing

Type of intervention	Component	Definition	Effects on primary outcomes of academic achievement		Other relevant potential effects
Non-academic or holistic supports	Out of school-time program	Academic combined with non-academic support (healthy snacks, physical education) after official class hours/over vacation	+	Small positive but insignificant effects from systematic reviews; some positive individual studies	Improve student's self-perception, enhance access to nutritious food and foster positive behavioural adjustments
	Coaching/mentoring	Delivery of non-pedagogical support such as counselling, advice	+	Small positive but insignificant effects from systematic reviews; some positive individual studies	Reduces absenteeism among at-risk students
	Parental engagement	Support or outreach to parents to raise involvement with education and/or school environment.	+/-	Low to negative insignificant effects from systematic reviews; some positive individual studies in combination with other interventions.	Increase social support at home

Key findings : What works to close the gap?

What is proven to work

Intensive supplementary instruction with a high degree of personalization and feedback

What works - but only in the short-term

Incentives that provide inducement as “a motivational device for intended learning” (Grove and Hadsell 2012, 1511)

What works – but for building other longer-term competencies

Student coaching and OST programs that target social-cognitive competencies such as stress-management, problem-solving, empathy and decision-making

What we need to make work better and more consistently

- Technological supports
- parental engagement



Local Context

Stakeholder consultation

- Informal confidential informational interviews over December 2021/March 2022.
- Consultation from multiple sectors from individuals working on the ground
 - senior officers from relevant public sector agencies (MCCY, MSF)
 - representatives of social service agencies/NGOs working with children and families
 - service designers engaged with a parenting intervention targeting similar populations
 - academics in the social science and education research sector
- Discussions were conducted for approximately 1 hour, during which key findings were shared and feedback solicited on potential intervention approaches and challenges

What do stakeholders think matters for interventions?

- Overall findings on specific approaches consistent but have nuances in local experience
 - Even within “proven interventions” there are further ground-level differences in delivery and quality eg “tutoring has a range”
 - Giving financial incentives to students for performance (in addition to existing bursaries and schemes) was not likely to be desirable or feasible as a standalone program
 - Mentoring relationships can be difficult to match and sustain without organic connections based on existing relationships, community affinities or pre-existing platforms.
- The real-world landscape is considerably more interlinked
 - Intervention approaches and mechanisms are not siloed in reality
 - Financial and non-financial economic support (outside scope of study) is of critical value
- Both design and Implementation on the ground for any approach will matter
 - Long-term commitment is critical but not always realized
 - Need to be clearly embedded within the wider context of the household and education system instead of being standalone.
 - Need to include significant time upfront to explain their goals and motivation as well as logistics and other practical matters, so as to obtain buy-in from the relevant stakeholders.
 - Tradeoffs and complexity of the local system vs a multipronged approach

What are some common strategic priorities?

Reaching a pragmatic common definition of SES

- Concern about conceptually defining SES and operational clarity
- Especially when different agencies have different definitions of low SES or at-risk families and children

Further developing an understanding of need

- SES lens may be too narrow, volatility or instability can be as important as level
- Vulnerability includes not only the most visibly economically disadvantaged households

Balancing the focus on achievement with more holistic objectives

- Counter to the efforts to encourage a new, more holistic vision of local education
- Overemphasizing academic results could perpetuate existing systemic biases and an inappropriate focus on test scores.

Addressing barriers to sustained participation as a first-order concern

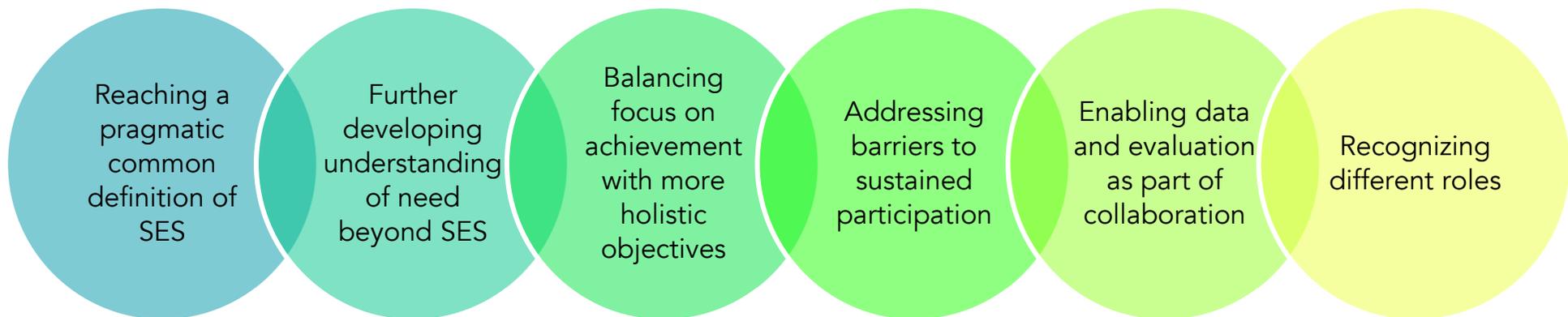
- Recruitment and maintenance are challenging even though needs are high, parents or caregivers are typically extremely busy or juggling multiple commitments
- Consider even streamlining or paring down the existing system instead of adding programs

How can we move dialogue forward?

- Making data insights accessible for practice
 - Supportive of taking an evidence-based approach to design and implementation, although a major constraint is the availability of access to data and requisite skill
- Building stronger evaluation capacity
 - All are engaged in efforts related to research and evaluation, albeit at varying stages but recognized this as a gap to be closed
 - Few have adopted stringent intake or graduation measures or systematically track the long-term academic performance of beneficiaries
- Expanding the platforms and mandate to work collaboratively
 - Recognize that different stakeholders have different roles
 - Non-governmental stakeholders could focus on the gaps in existing or planned programs while scaling programs could be the role of government
 - External stakeholders could also focus on highly specialized or tailored programs and finding ways for this work to “add value”,

In summary

- Even with limited information, clearly SES matters in Singapore
- Key approaches from international best practice may include immediate targeted, highly personalized learning supports or longer-term efforts to support more holistic SEL development, but adapted to the local needs
- Solutions require both vision and realistic expectations: individual-level access/feasibility, organizational-level implementation factors and system-level coordination/sustainability are all key



Thank you!
Questions & Reflections