

Home Numeracy Environment and SES

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Introduction

A growing body of research suggests that the home numeracy environment (HNE) is a predictor of children's mathematical abilities. Whilst the effect of a supportive home environment on child development is widely acknowledged, a robust finding in the literature is that the quality of the home environment is also an indicator of the socioeconomic status of a family (Bradley et al., 2001). This study investigated, i) the factor structure of HNE in Singapore, ii) whether the same factor structure was consistent across SES strata, and iii) concurrent and longitudinal interrelations between (HNE) and children's math achievement during the first year in kindergarten (n= 470 children; Mage at T1 = 57.3 months, SD= 3.8).

Methods

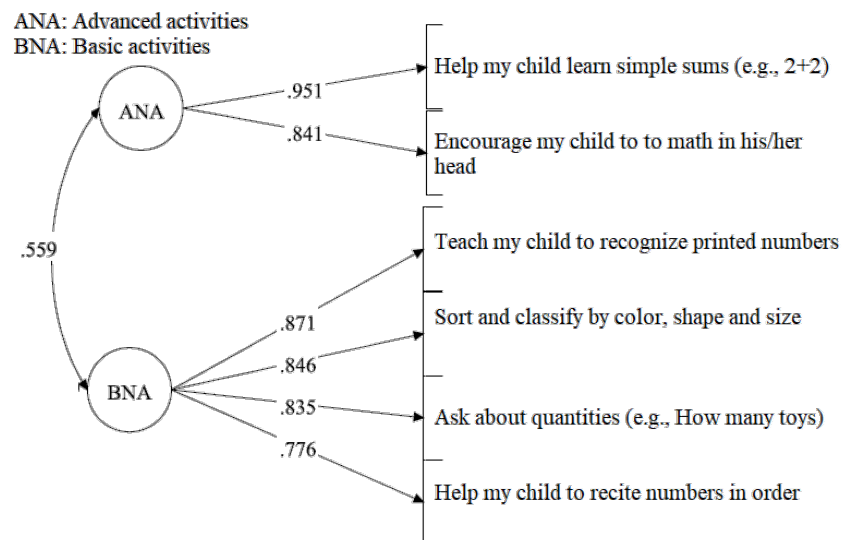
We collected measures of math achievement at K1 entry and at the end of K1 (TEMA-3). We also included measures of non-verbal ability as well as other control variables to account for time-varying observations. Information regarding maternal education (1=tertiary education) and the home numeracy environment (Skwarchuk et al. 2014) were collected at K1 entry.

Statistical approach

i) CFA; ii) Measurement invariance; iii) SEM. All descriptive and inferential statistical analyses were estimated using Mplus v.8.

Results

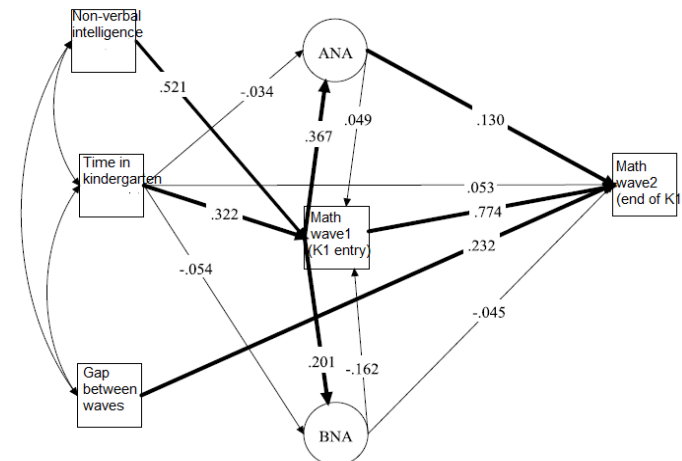
i) Factor structure of HNE: $\chi^2(8) = 21.15$, CFI = .985, TLI = .972, RMSEA = .060



ii) Measurement invariance across SES strata

Model	χ^2 (df)	$\Delta \chi^2$	RMSEA	CFI / TLI	AIC / BIC
Configural invariance	26.22 (16)	-	.053	.989 / .979	8917 / 9073
Metric invariance	28.99 (20)	1.23 (ns)	.045	.990 / .985	8910 / 9050
Scalar invariance	34.58 (24)	5.52 (ns)	.044	.988 / .985	8908 / 9031

iii) Factor structure of HNE: $\chi^2(32) = 55.94$, CFI = .987, TLI = .979, RMSEA = .040



Findings

A 2-factor structure was identified in both SES groups. More educated parents engaged their children more frequently in home numeracy activities. Activities that explicitly contributed to the understanding of addition and subtraction affected children's math growth independently of SES background and math skills at kindergarten entry.