

Supplementary Materials

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Perceived Barriers, Parental Attitudes, and Interactive Parent–Child Shared Reading: A PLS-SEM Study in Taiwan

Table S1. Construct-development and measurement-transparency map

Construct	Role / specification	Operational content	Conceptual / empirical basis	Development evidence	Current evidence and caveat
Interactive shared-reading behavior (BEH; 7 initial items, 5 retained)	Reflective endogenous outcome	Reciprocal, meaning-focused parent behavior during book reading: joint attention, page/picture involvement, story discussion, eliciting the child’s ideas, and undivided attention. The construct intentionally excludes reading frequency and fixed scheduling.	HLE and interactive/dialogic reading literature: Sénéchal & LeFevre (2002); Meng (2021); Riordan et al. (2022); Grøver et al. (2023).	Author-developed in Chinese; every item judged retain/revise/delete by a five-member review panel (two academics, a preschool director, a preschool teacher, and a parent) with written comments; pilot-tested with 50 parents in Changhua County for item analysis, exploratory factor analysis, and reliability.	Final 5-item measure: $\alpha=.904$, CR=.930, AVE=.726. Two reading-occasion items were removed because they were designed to record how often reading occasions occur rather than interactional quality, and because they were the weakest indicators of the seven (loadings .464 and .435 vs .798–.903). A sensitivity analysis retaining all seven items produced the same pattern of results; the refinement remains exploratory and requires independent replication.
Parental reading attitudes (ATT; 8 items)	Reflective intervening construct in the proposed indirect-association model	Perceived benefits, importance, and worth of shared reading for language development, reading interest, parent–child intimacy, future learning, and the parent’s guiding role.	Parental reading beliefs/evaluations and motivational reasoning: Ajzen (1991); Niklas et al. (2020); Kucirkova & Grøver (2024).	Same author-development, five-member review, and 50-parent pilot process as above.	$\alpha=.978$, CR=.981, AVE=.865. High internal consistency supports coherence in this sample, but the scale is not a validated subjective-task-value instrument and requires external and test-retest validation.
Time barriers (TIM; 8 items)	Reflective first-order barrier dimension; formative indicator of higher-order perceived barriers	Work demands, fatigue, scheduling conflicts, and insufficient time for sustained shared reading.	Shared-reading barrier literature: Celik et al. (2023); Nan & Tian (2025).	Same author-development, five-member review, and 50-parent pilot process as above.	$\alpha=.916$, CR=.931, AVE=.632; higher-order weight=.480, 95% CI [.236,.687].
Resource barriers (RES; 8 items)	Reflective first-order barrier dimension; formative indicator of higher-order perceived barriers	Access to age-appropriate books, suitable reading spaces, and convenient library/lending resources.	HLE/resource-access and barrier literature: Celik et al. (2023); Nan & Tian (2025); Yuan et al. (2024).	Same author-development, five-member review, and 50-parent pilot process as above.	$\alpha=.920$, CR=.935, AVE=.642; higher-order weight=.126, 95% CI [–.182,.432] (nonsignificant). Retained to preserve the theoretically specified formative domain; redundancy validity could not be tested without a global criterion.
Method barriers (MET; 8 items)	Reflective first-order barrier dimension; formative indicator of higher-order perceived barriers	Uncertainty about how to guide discussion, sustain participation, connect stories to daily life, and adjust reading difficulty.	Interactive-reading intervention and barrier literature: Riordan et al. (2022); Lorio et al. (2022); Nan & Tian (2025).	Same author-development, five-member review, and 50-parent pilot process as above.	$\alpha=.960$, CR=.966, AVE=.782; higher-order weight=.500, 95% CI [.212,.716].
Digital media barriers (DIG; 8 items)	Reflective first-order barrier dimension; formative indicator of higher-order perceived barriers	Competition or interference from smartphones, tablets, television, and other screen-based activities.	Digital HLE and shared-reading literature: Yuan et al. (2024); Sundqvist et al. (2024).	Same author-development, five-member review, and 50-parent pilot process as above.	$\alpha=.887$, CR=.900, AVE=.537; higher-order weight=.158, 95% CI [.011,.354].
Higher-order perceived barriers	Reflective–formative higher-order composite estimated with the two-	Overall multidimensional constraint system formed by TIM,	Higher-order construct specification: Sarstedt et al. (2019);	A priori domain specification; expert content review at item-	Dimension VIFs=1.13–2.08. Evidence supports content and

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	stage approach	RES, MET, and DIG. The dimensions are deliberately heterogeneous and not interchangeable manifestations of one latent trait.	domain content grounded in the family-literacy literature cited above.	development stage; first-order measurement assessment; formative collinearity check; bootstrap assessment of outer weights.	structural plausibility in this sample, but convergent validity of the higher-order composite was not established because no independent global barrier criterion was administered for redundancy analysis.

Note. This table consolidates information already reported in the revised manuscript and does not introduce new data. All items were rated on four-point scales: behavior items used a frequency format (1 = never, 4 = always) and attitude and barrier items an agreement format (1 = strongly disagree, 4 = strongly agree). The exact original Chinese questionnaire is not reproduced here and is available from the corresponding author upon reasonable request. α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.

Table S2. Item content and descriptive statistics (N = 309).

Construct	Item content (English)	M	SD
Interactive shared-reading behavior	Chooses books suited to the child's age and interests	2.57	0.96
	Involves the child in page turning and picture identification	2.83	0.92
	Pauses during reading to discuss story content	2.65	0.91
	Encourages the child to express ideas about characters or plot	2.61	0.89
	Gives the child undivided attention rather than multitasking	2.92	0.98
Parental reading attitudes	Improves the child's language development	3.44	0.66
	Fosters the child's interest in reading	3.43	0.65
	Strengthens parent-child closeness	3.46	0.66
	Is important even before the child can read	3.42	0.66
	Promotes learning more than solitary reading	3.36	0.68
	Helps the child's future academic performance	3.37	0.67
	Parents play an important guiding role	3.42	0.66
	Sustained investment in shared reading is worthwhile	3.39	0.67
Time barriers	Work demands make regular shared reading difficult	2.65	0.73
	Too tired after work to read with the child	2.59	0.75
	Household routines make a fixed reading time difficult	2.57	0.74
	Limited time available on weekdays	2.70	0.72
	Weekend commitments interfere with shared reading	2.49	0.75
	Shared reading is difficult to carry out in practice	2.30	0.75
	Shared reading drops in priority when time is short	2.78	0.67
	Reading ends hastily when chronically fatigued	2.68	0.72

Construct	Item content (English)	M	SD
Resource barriers	Not enough age-appropriate books at home	2.27	0.77
	Difficult to obtain books suited to the child's age	2.05	0.69
	Book costs reduce willingness to read together	2.17	0.75
	Home lacks a variety of children's books	2.33	0.78
	Unclear which libraries, bookstores, or online resources are suitable	2.12	0.76
	Library or community reading resources are inconvenient to reach	2.22	0.78
	Home lacks a quiet, comfortable reading space	2.18	0.76
	Cumbersome borrowing and inconvenient library location reduce reading frequency	2.20	0.76
Method barriers	Unsure how to guide discussion of story content	2.24	0.69
	Feels that reading aloud alone is not enough but unsure how to do more	2.45	0.72
	Unsure how to get the child to participate actively	2.29	0.75
	Unsure how to extend picture-book content to daily life	2.22	0.70
	Unsure how to continue when the child is distracted	2.38	0.77
	Lacks effective shared-reading techniques	2.33	0.74
	Unsure how to adjust depth to the child's level	2.34	0.72
	Lack of method undermines confidence in shared reading	2.24	0.73
Digital media barriers	Child is easily drawn to phones, tablets, or television	3.15	0.68
	Digital media use reduces the child's willingness to read books	2.97	0.73
	With e-books the child focuses on the device rather than the story	2.72	0.73
	Heavy household device use lowers the child's willingness to read	2.79	0.75
	After digital media exposure the child is less willing to read print	2.65	0.75
	The appeal of digital media makes it hard to focus the child on print	2.64	0.73
	Worries that digital media harm the child's reading concentration	3.01	0.69
	Over-gamified digital content reduces deep reading comprehension	2.90	0.71
Removed items	Sets aside a regular time to read with the child (removed)	—	—
	Arranges shared-reading time even when busy (removed)	—	—

Note. Items were administered in Chinese; English content is provided for reporting purposes. Behavior items were rated 1 = never to 4 = always; attitude and barrier items 1 = strongly disagree to 4 = strongly agree. Descriptive statistics are computed on the analysis dataset (N = 309) after the data screening described in Section 2.3. Descriptive statistics are not reported for the two removed reading-occasion items because a substantial share of responses to them could not be assigned to a response category (Section 2.3); these items do not enter the measurement model.