Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Trajectory Analysis

The strategy of model selection

Several goodness-of-fit and model adequacy indices were used to compare different models and to select the best one. The criteria were:

1. The smallest group had to include at least 7% of the sample.
2. Bayesian Information Criterion (BIC): the value closest to 0 indicates the best-fitting model.
3. The average posterior probability (AvePP) for each group had to be more than 0.7.
4. The odds of correct classification (OCC) for each group had to be more than 5.0.

First step: selection of the number of trajectories

As the choice of the order of the trajectory for each group is less important than the choice of the number of such groups, the order of the polynomial is determined by a highest order (quartic). The BIC values, group proportions, APP, and OCC for the 2-, 3-, and 4-group-based trajectory models were used to determine the best model. A 5-group model was tested but failed to converge. Statistical parameters for 2-, 3-, and 4-group-based trajectory models all met the criteria of group proportion, APP, and OCC (eTable 3). The BIC value continued to increase as more groups were added. In such an instance, more subjective criteria based on domain knowledge should be used to select the number of groups. Groups 2 and 3 in the 4-group-based trajectory model have a pattern similar to that of Group 3 in the 3-group-based trajectory model (eTable 2). As it is recommended to select a model with no more groups than are necessary to communicate the distinct features of the data, a 3-group-based trajectory model was selected as the final model. The screen time trajectories of individuals in three groups were presented in eFigures 3, 4, and 5.

Second step: Selection of the polynomial terms of each group

Once the number of groups is identified, we then reduce the polynomial orders until the highest order polynomial for each group is significant at the confidence level alpha (a) = 0.01. The final model had a cubic order for the first group (slow increasing), a linear order for the second group (rapid increasing), and a quartic order for the third group (early increasing).

eTable 1. Participant Characteristics of Sample Included in the Analysis

Characteristics	All (*n* = 262)	Included in Analysis (*n* = 152)	*p*-value
Sex, *n* (%)			
Male	132 (50.4)	75 (49.3)	0.84
Female	130 (49.6)	77 (50.7)	
Mother's educational attainment, *n* (%)			
High school and below	23 (8.8)	12 (7.9)	0.94
College or bachelor's degree	196 (74.8)	114 (75.0)	
Master's degree or above	43 (16.4)	26 (17.1)	
Family income, *n* (%)			
139k RMB and below	102 (38.9)	54 (35.5)	0.79
140-199k RMB/year	72 (27.5)	44 (29.0)	
200k RMB and above	88 (33.6)	54 (35.5)	

eTable 2. Statistical Parameters for 2-, 3-, and 4-Group-Based Trajectory Models

Parameter	Number of groups		
	2	3	4
BIC (*N* = 152)	-4945.97	-4927.78	-4920.09
BIC (*N* = 1,045)	-4957.54	-4945.13	-4943.22
N (observed group proportion, %)/ (group proportion based on posterior probability, %)			
Group 1	120 (78.9) / (78.6)	111 (73.0) / (72.2)	104 (68.4) / (68.3)
Group 2	32 (21.1) / (21.4)	17 (11.2) / (12.9)	11 (9.9) / (10.2)
Group 3		24 (15.8) / (15.0)	18 (10.5) / (10.2)
Group 4			13 (11.2) / (11.4)
AvePP / OCC			
Group 1	0.97 / 9.2	0.97 / 11.0	0.97 / 9.4
Group 2	0.91 / 37.5	0.92 / 94.9	0.86 / 45.2
Group 3		0.89 / 45.0	0.93 / 57.0
Group 4			0.87 / 165.0

Note: The trajectory of each group was the quartic polynomial order.
BIC: Bayesian information criterion; AvePP: Average posterior probability; OCC: odds of correct classification.

eTable 3. Cognitive and Psychosocial Development of Children at 72 Months by Screen Time Trajectory Group

Development score	All (N = 152)	Screen time trajectory group			p-value
		Continued low (n = 110)	Late increasing (n = 17)	Early increasing (n = 25)	
WISC-IV scores, mean (SD)					
Full-Scale Intelligence Quotient	114.27 (12.33)	116.14 (12.26)	108.35 (11.98)	110.08 (10.94)	<0.01
General Abilities Index	119.99 (14.73)	121.10 (15.33)	113.88 (14.25)	119.28 (11.43)	0.17
Verbal Comprehension	116.05 (12.02)	116.65 (12.56)	112.06 (12.35)	116.16 (8.87)	0.34
Perceptual Reasoning	117.92 (14.24)	119.45 (14.33)	110.71 (13.73)	116.12 (12.95)	<0.05
Cognitive Proficiency Index	102.70 (13.33)	104.85 (13.14)	99.47 (11.52)	95.44 (12.72)	<0.01
Working Memory	103.11 (12.73)	105.53 (13.01)	98.41 (8.49)	95.68 (10.14)	<0.001
Processing Speed	101.64 (12.55)	103.09 (11.49)	100.47 (13.05)	96.04 (15.31)	<0.05
SDQ scores, mean (SD)					
Total Difficulties	9.41 (4.51)	8.91 (4.48)	10.71 (4.48)	10.72 (4.39)	0.09
Emotional Symptoms	1.86 (1.63)	1.86 (1.61)	1.88 (1.73)	1.80 (1.73)	0.98
Conduct Problems	1.47 (1.23)	1.38 (1.14)	1.65 (1.17)	1.72 (1.62)	0.38
Hyperactivity/ Inattention	3.97 (2.50)	3.59 (2.50)	4.94 (2.59)	4.96 (2.01)	<0.05
Peer Relationship Problems	2.12 (1.48)	2.07 (1.58)	2.24 (1.20)	2.24 (1.20)	0.83
Prosocial behavior	7.39 (2.06)	7.25 (2.10)	7.82 (2.16)	7.68 (1.80)	0.42

Note: WISC-IV: Wechsler Intelligence Scale for Children (Fourth Edition); SDQ: Strengths and Difficulties Questionnaire.

eTable 4. Comparison of Demographic Characters Between Current Study and SCHDULE-P Study

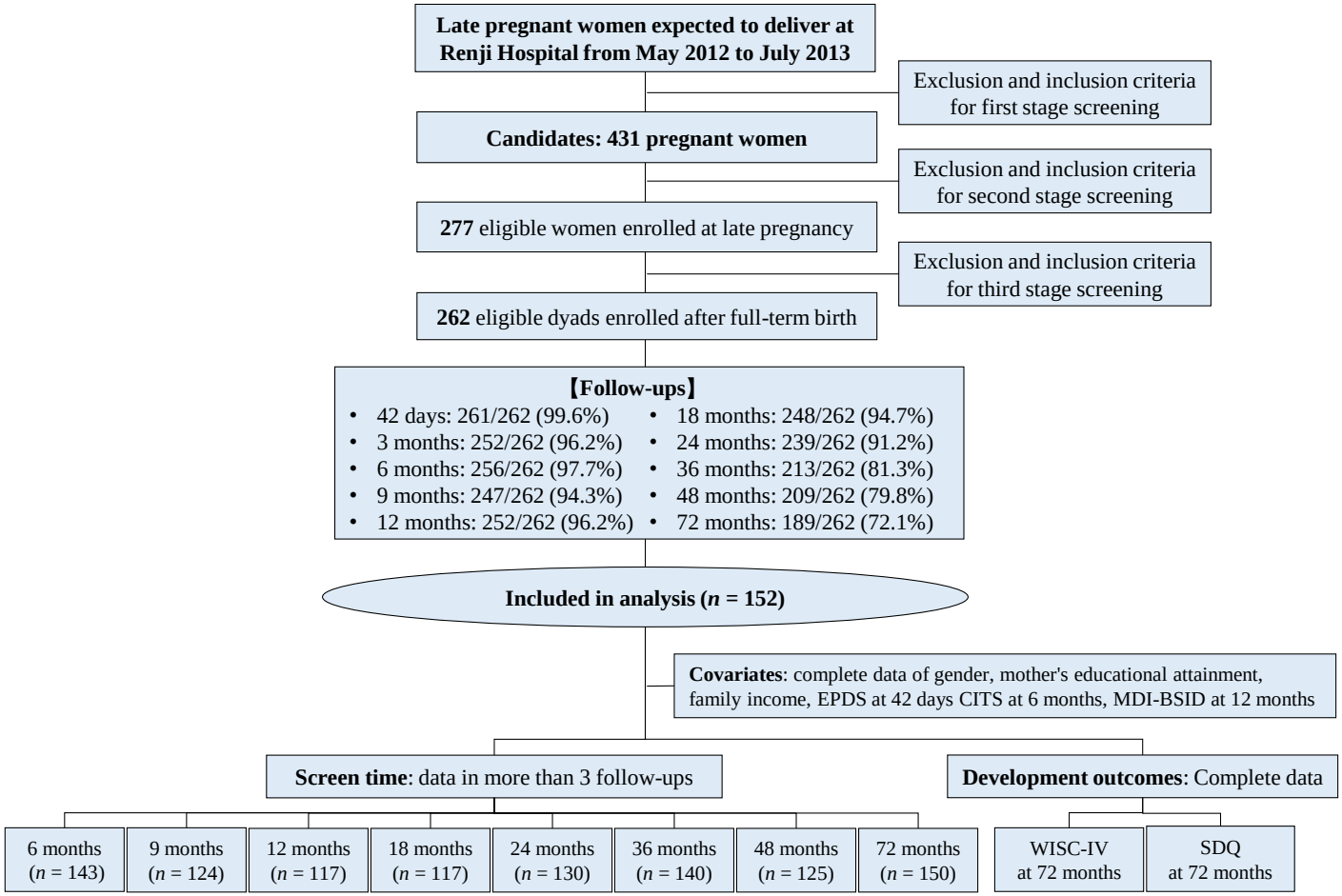
	Current study (n = 262)	SCHEDELU-P study	
		Sample (n = 20324)	Weighted proportion[a] (95% CI)
Birthday range	June 2012 to August 2013	December 2011 to July 2014	N/A
Sex, n (%)			
Male	132 (50.4)	10573 (52.1)	52.2 (51.3, 53.2)
Female	130 (49.6)	9751 (48.0)	47.8 (46.8, 48.7)
Mother's educational attainment, n (%)			
High school and below	23 (8.8)	4269 (21.0)	26.1 (25.1, 27.0)
College or bachelor's degree	196 (74.8)	13794 (67.9)	64.1 (63.1, 65.0)
Master's degree or above	43 (16.4)	2198 (10.8)	9.5 (9.0, 10.0)
Unknown/refused	0 (0.0)	63 (0.3)	0.4 (0.3, 0.5)

Note: a. Sampling weights were computed using inverse probability weighting, using which the results represent 167,597 children enrolled kindergartens in 2016.

Reference: Wang X, Zhang Y, Zhao J, Shan W, Zhang Z, Wang G, Jiang Y, Zhu W, Zhang D, He Y, Mao H, Qu J, Zhu Q, Jiang F. Cohort Profile: The Shanghai Children's Health, Education and Lifestyle Evaluation, Preschool (SCHEDULE-P) study. Int J Epidemiol. 2021 May 17;50(2):391-399.

eTable 5. Eligibility Criteria of Sample in Birth Cohort

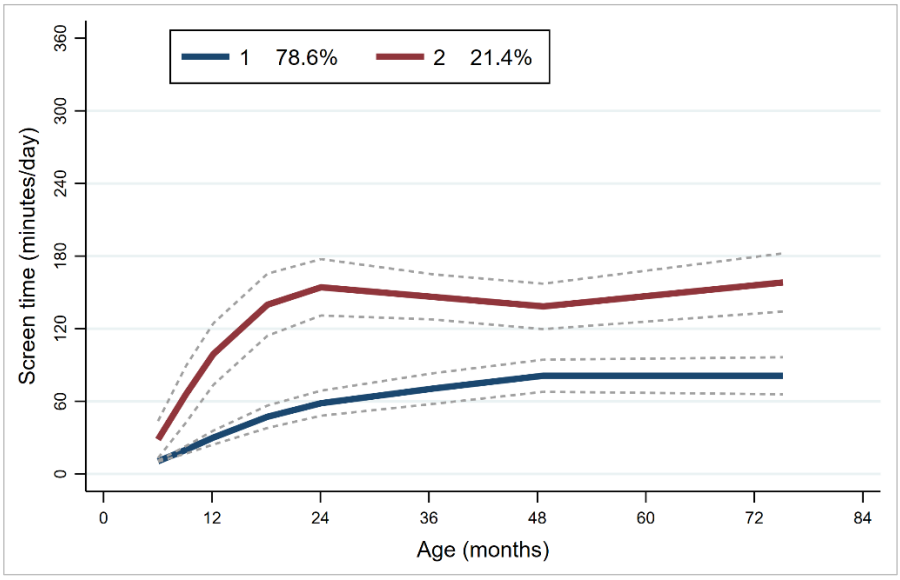
Inclusion Criteria	Exclusion Criteria
First stage of screening:	
Eligible pregnant women:	Pregnant women were excluded if they were diagnosed with:
1. were age 18 to 45 years 2. were of gestational age ≥28 weeks 3. had ultrasonography that indicated singleton pregnancy without any known deformity	1. preterm labor symptoms during pregnancy 2. gestational hypertension (≥20 weeks of gestation, two consecutive measurements, systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg) 3. gestational diabetes mellitus (75 g oral glucose tolerance test): fasting blood glucose level ≥5.1 mmol/L (92 mg/dl), 1-hour blood glucose level ≥10.0 mmol/L (180 mg/dl), or 2-hour blood glucose level ≥8.5 mmol/L (153 mg/dl) 4. organic heart disease (rheumatic heart disease, congenital heart disease, coronary heart disease, dilated cardiomyopathy, hypertrophic cardiomyopathy, or heart failure (heart function III level or higher) 5. severe lung disease (active pulmonary tuberculosis or pulmonale) 6. liver diseases (active hepatitis or liver cirrhosis) 7. chronic kidney disease (chronic nephritis, nephroma, or chronic renal insufficiency) 8. severe blood disease (primary thrombocytopenia, aplastic anemia, hemophilia, or severe anemia (hemoglobin < 60 g/L) 9. autoimmune diseases (rheumatoid arthritis, systemic lupus erythematosus, or scleroderma) 10. thyroid dysfunction (primary hypothyroidism) 11. acquired immune deficiency syndrome (AIDS), gonorrhea, or syphilis 12. cancer or mental disorders
Second stage of screening:	
Eligible pregnant women:	
1. were long-term residents in Shanghai and delivered in the eastern division of the Renji Hospital 2. was willing to participate in the study along with follow-up visits at the specified time 3. had no difficulty in language communication 4. was not participating in other clinical research projects	
Third stage of screening:	
Eligible neonates were:	Neonates were excluded if they:
born at term	1. were admitted to the neonatal intensive care unit after birth 2. had Apgar score ≥7 at 1 or 5 minutes asphyxia at birth



eFigure 1. Flowchart of the Study Participants

Notes: EPDS: Edinburgh Postnatal Depression Scale; BSID-MDI, Bayley Scales of Infant Development-Metal Scale Index; CITS, Chinese Infant Temperament Scale. WISC-IV, Wechsler Intelligence Scale for Children (Fourth Edition); SDQ, Strengths and Difficulties Questionnaire.

a.



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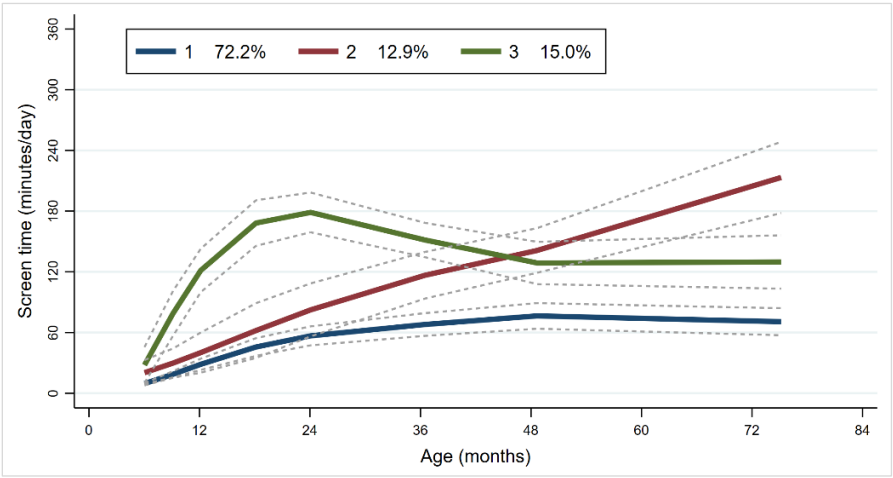

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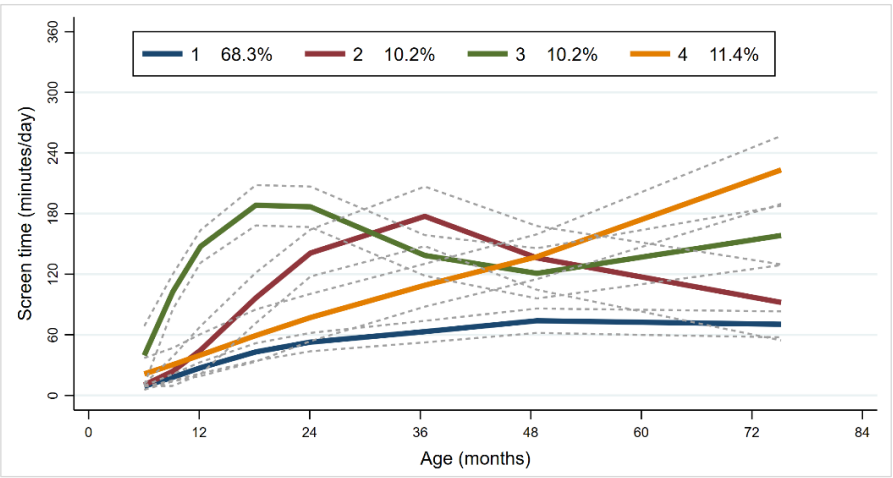
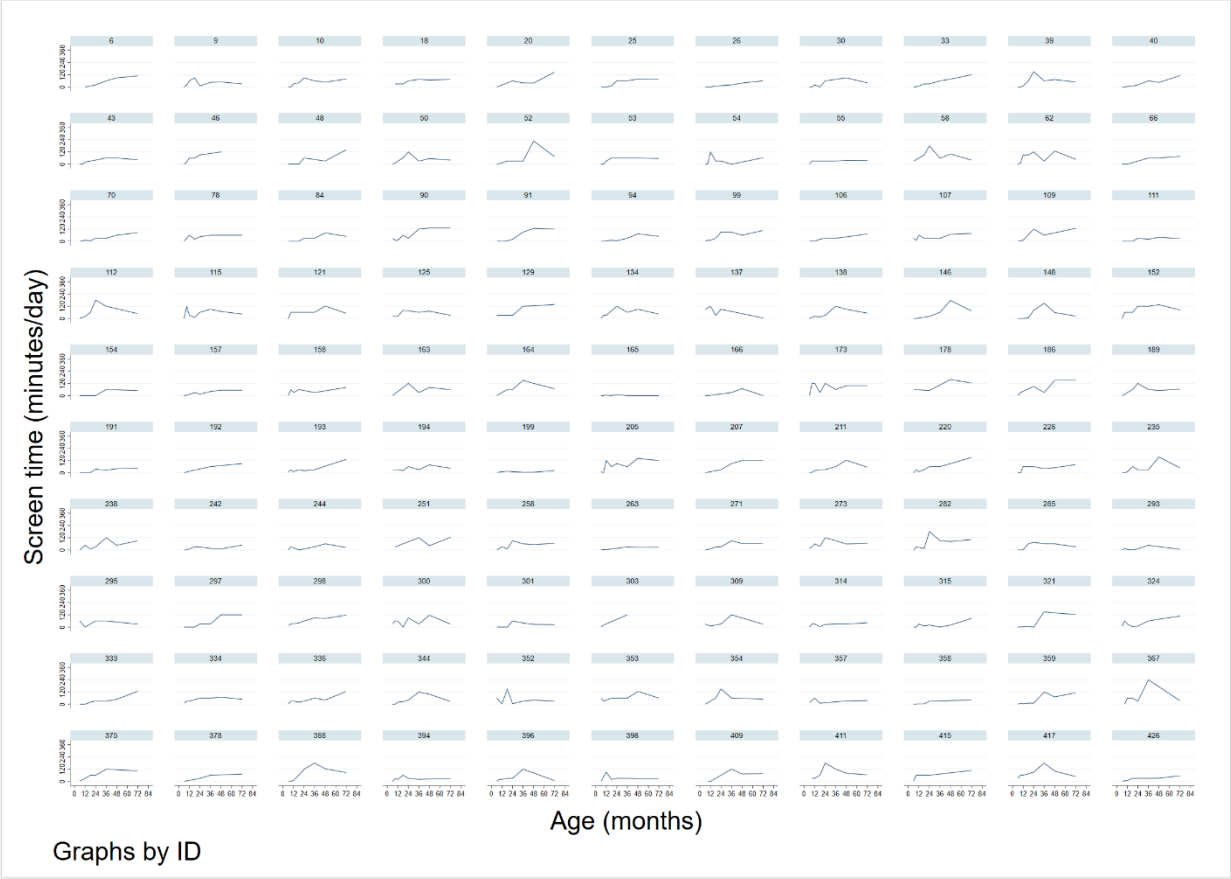
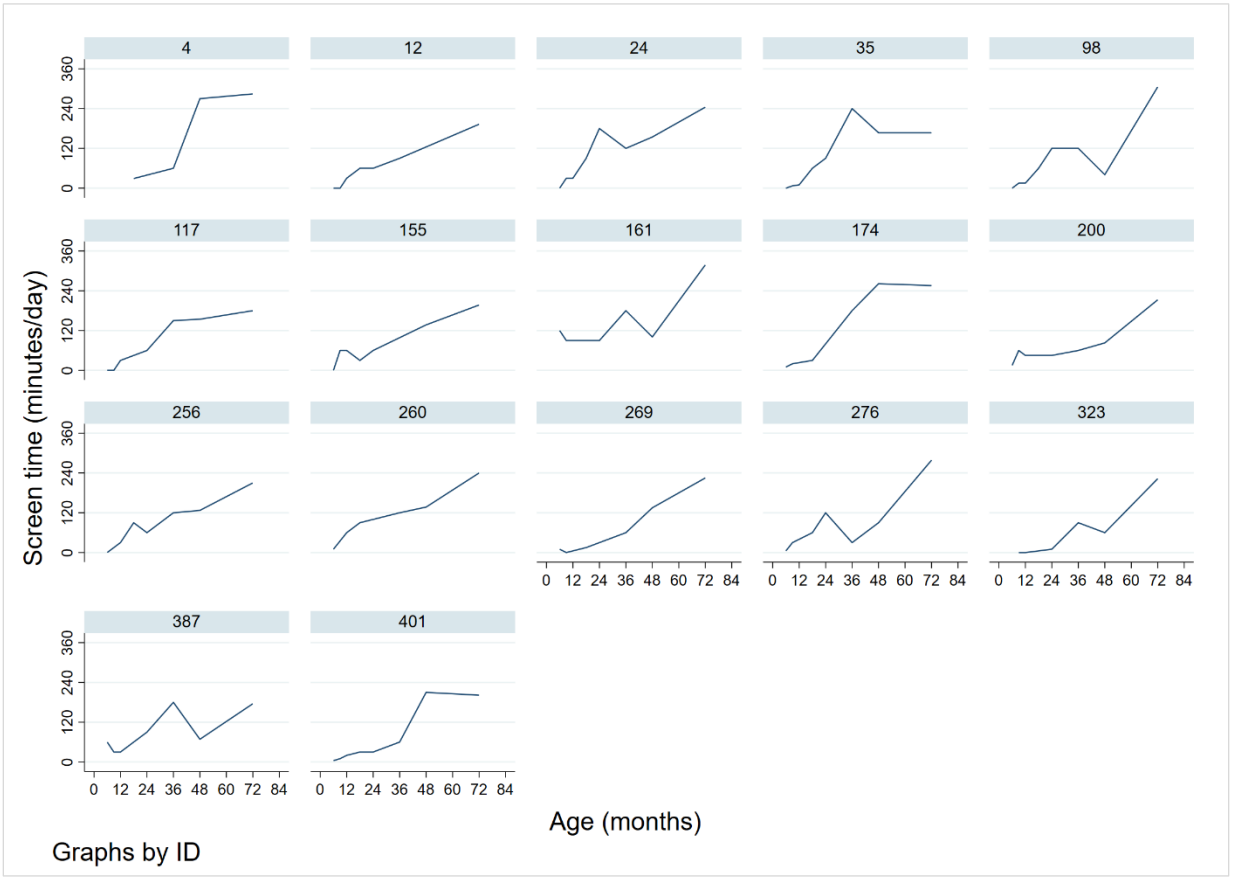


eFigure 2. Group-Based Trajectory Models for 2-, 3-, and 4-Group Adherence Trajectory Solution

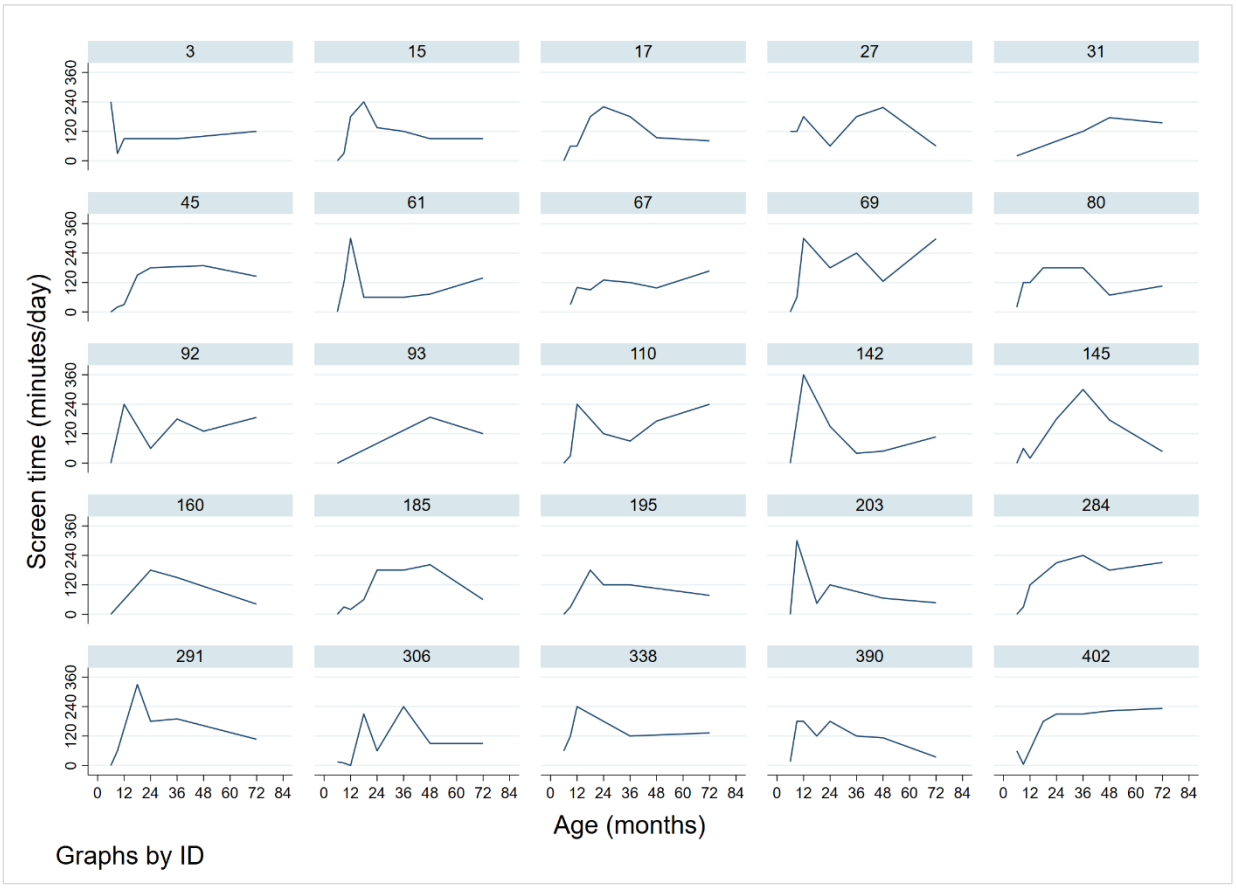
Note: The trajectory of each group was quartic polynomial order.



eFigure 3. Screen Time Trajectories of Individuals in the Continued Low Group



eFigure 4. Screen Time Trajectories of Individuals in the Late Increasing Group



eFigure 5. Screen Time Trajectories of Individuals in the Early Increasing Group