

Purpose

- Deaf children in the U.S. are not achieving age-appropriate literacy in English¹
- Many of these deaf children experience language deprivation
 - English is inaccessible
 - Not exposed to American Sign Language (ASL)
- Research Question 1:** Does exposure to ASL in the home – prior to formal education – improve English literacy outcomes?
- Research Question 2:** Does it matter whether parents are deaf ASL signers or hearing parents learning ASL?

Background

- 90-95% of deaf infants are born to hearing parents in the U.S.²
 - Vast majority of hearing parents do not know ASL
 - Deaf children exposed to spoken language rather than a sign language
 - Language acquisition during the sensitive period in development is crucial for the development of literacy skills³
 - Deaf children experience limited access to a spoken language and start school unprepared for academic learning⁴
- In contrast, 5-10% of deaf children have deaf parents
 - Higher ASL fluency and literacy skills than deaf children with hearing parents⁵
 - Correlation between ASL fluency and English literacy assessment score was found (higher ASL fluency → higher literacy scores)^{6,7}
- Lev Vygotsky – Sociocultural Theory of Development
 - Spoken language “plays almost no part in [a deaf child’s] development and is not a tool they can use to accumulate cultural experience or to participate in social life” (p. 323)⁸
- Pathways by which ASL can boost written English literacy
 - Language development – early exposure to ASL provides a tool for obtaining world knowledge and metalinguistic skills
 - Cultural development – ASL provides access to cultural experiences and social interactions that boost learning

Current Study

- NWEA MAP Literacy data from 288 deaf children attending ASL-English bilingual school in Southwestern U.S.
- Hypothesis 1:** Deaf children whose parents reported signing at home (prior to school entry) will show faster literacy growth than those whose parents did not
- Hypothesis 2:** Within families who report signing with their deaf children, those from deaf families will show faster literacy growth than those from hearing families

Methodology

- Ethical approval from RIT and the school was received
- Accessed archival of administrative student data received at school intake
- All data were de-identified, and a unique selected I.D. code were assigned to students
- No attempt were made to identify students on the basis of information within the database

Measures Selected for Current Study

- NWEA MAP Literacy (Grades 1-12)
- Birth parent hearing status
- Age of first exposure to ASL
- Use of sign in home at school intake
- Socio-economic status
 - Primary caregiver education and employment at school intake
- Audiometry and medical history
 - Pure tone average hearing level (most recent)
 - Age at which hearing aid intervention was initiated

Statistical Analysis

- Linear mixed models
 - School semester (1-20) and predictor of interest (signing family, deaf family) as fixed effects
 - Time modelled using log(age at time of test)
 - AR1 covariance structure to account for correlated repeated measures
 - All covariates introduced initially and removed hierarchically until only significant predictors remained

Hypothesis 1: Signing Homes

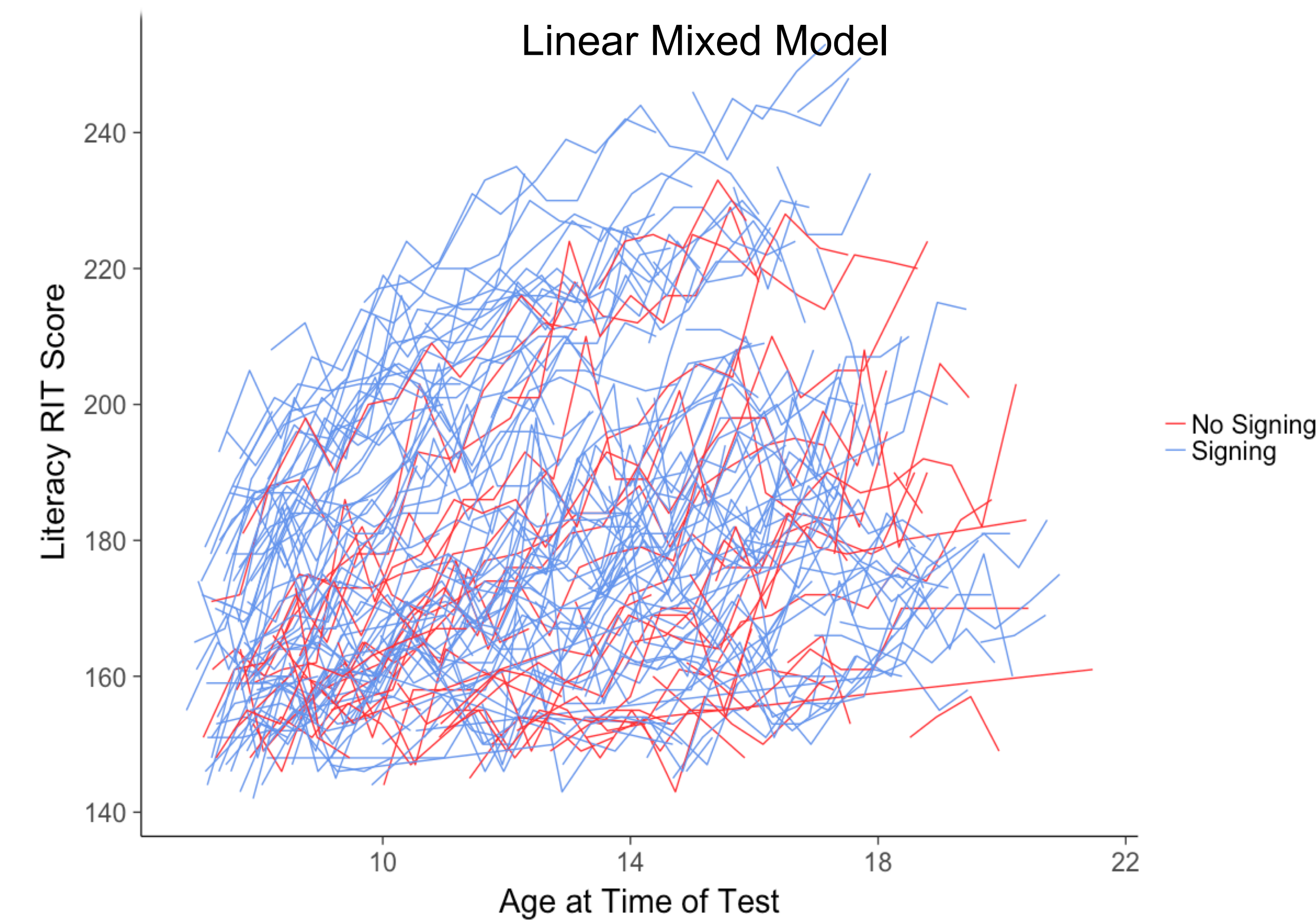
	N	Variable	N	M	SD
Non-Signing Home	70	Age of first exposure to ASL	51	3.63	2.87
		Age received hearing aids	41	3.20	2.22
		Age of entry to school	70	9.71	4.80
		Most recent PTA hearing loss	55	87.90	21.94
		SES composite	37	29.40	15.15
Signing Home	209	Age of first exposure to ASL	188	1.38	2.02
		Age received hearing aids	136	2.33	2.16
		Age of entry to school	207	8.49	4.91
		Most recent PTA hearing loss	151	89.65	19.82
		SES composite	135	40.83	15.70

Hypothesis 2: Deaf Families

	N	Variable	N	M	SD
Hearing Family	112	Age of first exposure to ASL	98	2.38	2.87
		Age received hearing aids	89	2.36	2.22
		Age of entry to school	111	10.38	4.80
		Most recent PTA hearing loss	71	90.18	21.94
		SES composite	78	37.03	15.15
Deaf Family	95	Age of first exposure to ASL	88	0.27	2.15
		Age received hearing aids	46	2.65	1.89
		Age of entry to school	94	6.25	4.80
		Most recent PTA hearing loss	79	89.04	17.60
		SES composite	57	46.03	12.30

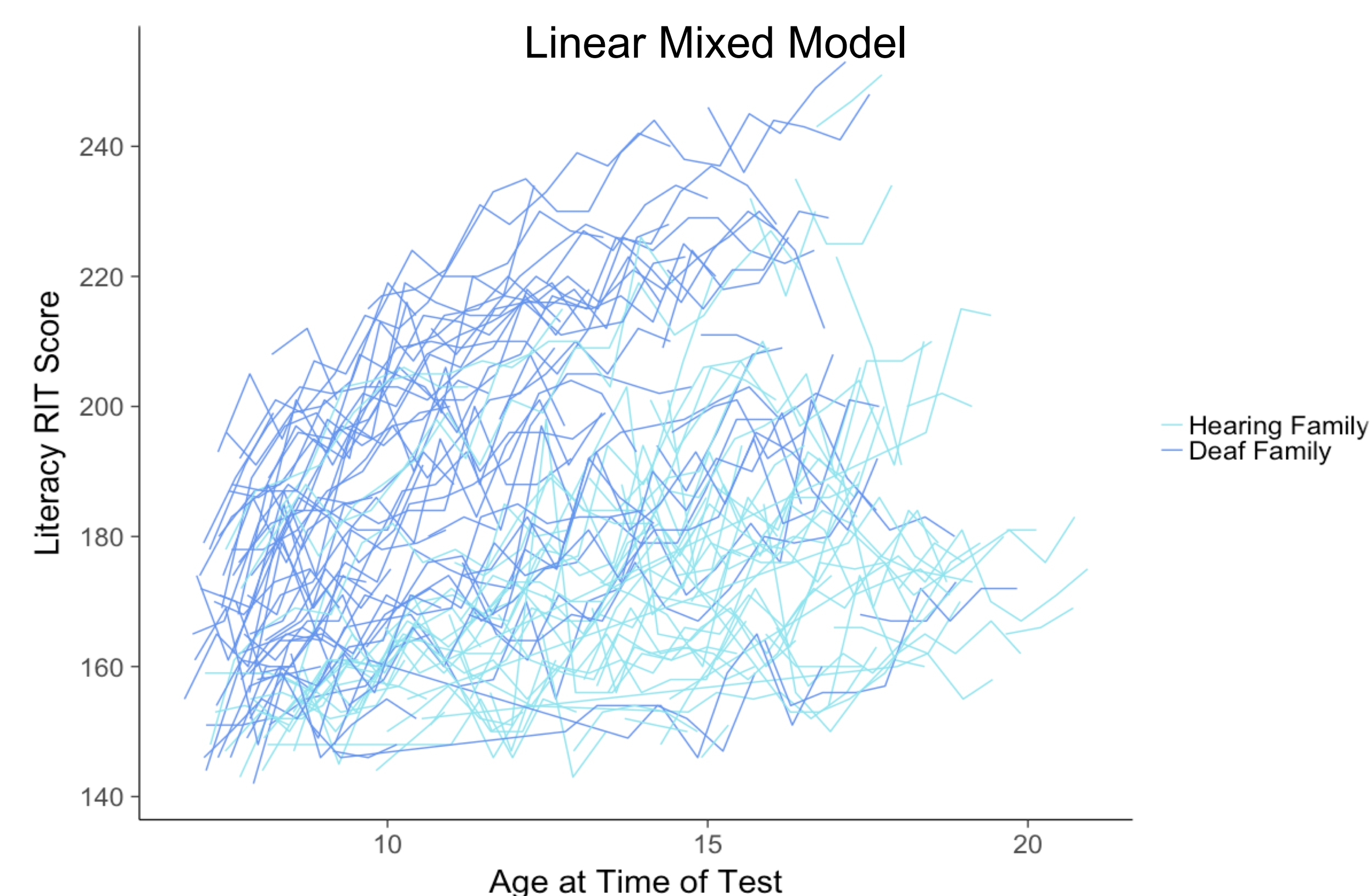
Hypothesis 1 Results

Effect	Estimate	Standard Error	DF	t value	Pr > t
Intercept	53.0273	11.0470	123	4.80	<.0001*
log(test age)	45.1055	4.0066	890	11.26	<.0001*
Sign	-3.7247	3.9261	123	-0.95	0.3446
Age intro to ASL	-3.2868	0.8014	123	-4.10	<.0001*
SES composite	0.5138	0.09595	123	5.36	<.0001*



Hypothesis 2 Results

Effect	Estimate	Standard Error	DF	t value	Pr > t
Intercept	27.7889	12.1770	95	2.28	0.0247*
log(test age)	50.5301	4.3555	687	11.60	<.0001*
Deaf family	15.8643	3.6722	95	4.32	<.0001*
Age intro to ASL	-2.6040	1.0963	95	-2.38	0.0195*
SES composite	0.5077	0.09974	95	5.09	<.0001*



Discussion

Hypothesis 1: Deaf children whose parents reported signing at home (prior to school entry) will show faster literacy growth than those whose parents did not

- When controlling for age of ASL exposure and SES, effect of signing at home was not significant
- For purpose of literacy development, earlier exposure to ASL seems to be more important than parents communicating using ASL with their children at home
- No significant interaction effect was found between test age and signing in the home

Hypothesis 2: Within families who report signing with their deaf children, those from deaf families will show faster literacy growth than those from hearing families

- Effect of deaf family was significant after controlling for age of ASL exposure and SES
- Children from deaf families show an advantage even after controlling for earlier ASL exposure and higher SES levels

Conclusion

- Deaf children with delayed access to ASL, especially those from low SES backgrounds, are at risk for weaker English literacy development
- Deaf families provide a language model and a strong socio-cultural environment
- Language and socio-cultural environment before entering school seems to be crucial for literacy development