Early Self-Regulation Skills and Maternal Involvement Influencing Academic Performance and School Attendance

A thesis submitted by

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Abstract

This Master's thesis investigated the associations between self-regulation skills (executive functioning and emotion regulation) established in early childhood and academic performance (English Language Arts and Mathematics) and school attendance records in elementary school. Maternal involvement, which was documented through parent-teacher communication, volunteering at school, and involvement in implementing enriching home literacy environments, was also evaluated to examine if these involvement activities created any significant differences in the relation between early self-regulation skills and academic performance and school attendance in elementary school. These findings indicated that early self-regulation skills predicted academic performance in elementary school. Child's sex and mother's race/ethnicity showed significant differences when predicting academic performance regarding English Language Arts competencies. There were no other significant findings. These findings imply that self-regulation skills are important skills for children to practice and develop during early childhood in order to thrive in more challenging, structured academic settings.

Keywords: self-regulation, executive functioning, emotion regulation, maternal involvement, academic performance, school attendance

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Table 1

Descriptive Statistics of Primary Variables

Construct	Variable (Collection Time Point)	*n*	M (SD)	Range	Skewness	Kurtosis
Child Sex	Boy vs. Girl (T5)	Boy: 231 (52%) Girl: 214 (48%)				
Child Age (In Years)	Age (T5)		6.09 (0.54)			
Maternal Age	Age (T5)		24.9 (1.30)			
Maternal Race/ Ethnicity	White (non-Hispanic)	160 (36%)				
	Black (non-Hispanic)	93 (21%)				
	Hispanic	160 (36%)				
	Other (non-Hispanic) (T5)	32 (7%)				
Executive Functioning	HTKS: Total and Practice Trials (T5)	158	58.823 (28.403)	0-94	-.873	-.504
Emotion Regulation	ERC: Dysregulation Mean Score (T5)	158	1.809 (0.485)	1.00-3.58	.864	1.026
Maternal Involvement	PTI: Frequency of Parent-Teacher Contact Mean Score (T5)	158	1.238 (0.822)	0-4	.897	.732
Maternal Involvement	PTI: Parent Involvement and	158	1.756 (0.509)	.71-4.00	.644	1.475

	Volunteering at School Mean Score (T5)					
Maternal Involvement	HLEQ: Parent's Involvement with Literacy at Home Mean Score (T5)	158	3.883 (1.028)	.20-6.00	-.806	.561
Academic Performance	MCAS: ELA Scaled Score (3rd Grade)	Total: 158 Not Meeting Expectations: 11 (7%) Partially Meeting Expectations: 79 (50%) Meeting Expectations: 61 (39%) Exceeding Expectations: 7 (4%)	491.818 (19.086)	443-554	.158	.351
Academic Performance	MCAS: Math Scaled Score (3rd Grade)	Total: 158 Not Meeting Expectations: 30 (19%) Partially Meeting Expectations: 72 (46%) Meeting Expectations: 51 (32%) Exceeding Expectations: 5 (3%)	485.981 (22.148)	442-560	.287	.069

School Attendance	Was Child Chronically Absent in 3rd Grade? (3rd Grade)	Total: 158 No (0): 127 (80%) Yes (1): 31 (20%)

Table 2

Correlation Analysis among Primary Continuous Variables

	HTKS: Total and Practice Trials (T5)	ERC: Dysregulation Mean Score (T5)	PTI: PC Mean Score (T5)	PTI: PI Mean Score (T5)	HLEQ: PI Mean Score (T5)	MCAS: ELA Scaled Score (3rd Grade)	MCAS: Math Scaled Score (3rd Grade)
HTKS: Total and Practice Trials (T5)	1.00	-.218**	-.032	-.052	.026	.396**	.375**
ERC: Dysregulation Mean Score (T5)	-.218*	1.00	.105	-.075	-.075	-.135*	-.187*
PTI: PC Mean Score (T5)	-.032	.105	1.00	.451**	.156**	-.076	-.082
PTI: PI Mean Score (T5)	-.052	-.075	.451**	1.00	.430**	-.084	-.076
HLEQ: PI Mean Score (T5)	.026	-.075	.156**	.430**	1.00	-.026	-.085
MCAS: ELA Scaled Score (3rd Grade)	0.396**	-.135*	-.076	-.084	-.026	1.00	-.756**
MCAS: Math Scaled Score (3rd Grade)	0.375**	-.187**	-.082	-.076	-.085	.756**	1.00

Notes:
**p < .01
*p < .05

Table 3

Logistic Regression: Executive Functioning, Emotion Regulation, and Maternal Involvement predicting Chronic Absenteeism in 3rd Grade
(n = 158)

	B (SE)	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-2.056 (1.239)	2.753	0.128		
HTKS	-0.002 (0.007)	0.059	0.998	.985	1.012
ERC	0.516 (0.397)	1.688	1.675	.769	3.647
PTI: PC	0.402 (0.256)	2.453	1.494	.904	2.470
PTI: PI	-0.397 (0.482)	0.680	0.680	.261	1.728
HLEQ: PI	-0.044 (0.206)	0.045	0.957	.639	1.433

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 4

Multiple Regression: HTKS Scores Predicting MCAS: ELA Scores in 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	491.034 (2.583)		190.102*
Child's Sex	4.026 (2.989)	0.104	1.04
Race/Ethnicity: White	1.738 (3.587)	0.042	0.485
Race/Ethnicity: Black	-7.534 (3.922)	-0.161	-1.921
Race/Ethnicity: Other	-3.686 (5.606)	-0.052	-0.658
Model 2			
(Constant)	476.768 (4.265)		111.786*
Child's Sex	2.483 (2.859)	0.064	0.869
Race/Ethnicity: White	-0.855 (3.428)	-0.020	-0.249
Race/Ethnicity: Black	-6.100 (3.709)	-0.130	-1.645
Race/Ethnicity: Other	-1.794 (5.302)	-0.026	-0.338
PTI: PC	-0.943 (1.711)	0.040	0.551
HTKS	0.241 (.051)	0.354	4.732*
Model 3			
(Constant)	477.820 (6.286)		76.013*
Child's Sex	2.413 (2.884)	0.063	0.837
Race/Ethnicity: White	-0.712 (3.495)	-0.017	-0.204
Race/Ethnicity: Black	-6.039 (3.804)	-0.131	-1.588
Race/Ethnicity: Other	-3.005 (5.408)	-0.044	-0.556
PTI: PC	0.891 (6.395)	0.024	0.139
HTKS	0.222 (0.095)	0.327	2.330*
HTKS x PTI: PC Interaction	0.014 (0.062)	0.048	0.228

Note. Key: *= $p < .05$, *SE* = standard error.

Table 5

Multiple Regression: HTKS Scores Predicting MCAS: ELA Scores in 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	492.144 (2.633)		186.928*
Child's Sex	4.305 (3.018)	0.112	1.426
Race/Ethnicity: White	-0.047 (3.642)	-0.001	-0.013
Race/Ethnicity: Black	-7.509 (3.936)	-0.163	-1.908
Race/Ethnicity: Other	-4.896 (5.614)	-0.071	-0.872
Model 2			
(Constant)	483.344 (6.198)		77.978*
Child's Sex	2.459 (2.897)	0.064	0.849
Race/Ethnicity: White	-2.702 (3.523)	-0.065	-0.767
Race/Ethnicity: Black	-5.763 (3.763)	-0.125	-1.532
Race/Ethnicity: Other	-2.608 (5.348)	-0.038	-0.488
PTI: PI	-2.279 (2.792)	-0.060	-0.817
HTKS	0.234 (0.053)	0.342	4.436*
Model 3			
(Constant)	478.104 (11.355)		42.104*
Child's Sex	2.660 (2.926)	0.069	0.909
Race/Ethnicity: White	-2.992 (3.570)	-0.072	-0.828
Race/Ethnicity: Black	-6.039(3.804)	-0.131	-1.588
Race/Ethnicity: Other	-3.005 (5.408)	-0.044	-0.556
PTI: PI	0.891 (6.395)	0.024	0.139
HTKS	0.325 (0.174)	0.476	1.876
HTKS x PTI: PI Interaction	-0.054 (0.098)	-0.166	-0.551

Note. Key: *= $p < .05$, *SE* = standard error.

Table 6

Multiple Regression: HTKS Scores Predicting MCAS: ELA Scores in 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	492.219 (2.517)		195.572*
Child's Sex	5.269 (2.910)	0.134	1.811
Race/Ethnicity: White	0.992 (3.509)	0.023	0.283
Race/Ethnicity: Black	-7.984 (3.824)	-0.166	-2.088*
Race/Ethnicity: Other	-7.774 (5.323)	-0.112	-1.460
Model 2			
(Constant)	484.634 (5.892)		82.257*
Child's Sex	4.113 (2.787)	0.105	1.476
Race/Ethnicity: White	-1.149 (3.331)	-0.027	-0.345
Race/Ethnicity: Black	-6.364 (3.613)	-0.132	-1.761
Race/Ethnicity: Other	-5.237 (5.035)	-0.075	-1.040
HLEQ: PI	-1.553 (1.318)	-0.082	-1.178
HTKS	0.244 (0.049)	0.353	4.956*
Model 3			
(Constant)	492.156 (10.527)		46.752*
Child's Sex	3.697 (2.831)	0.094	1.306
Race/Ethnicity: White	-0.688 (3.377)	-0.016	-0.204
Race/Ethnicity: Black	-6.073 (3.632)	-0.126	-1.672
Race/Ethnicity: Other	-4.740 (5.071)	-0.0.68	-0.935
HLEQ: PI	-3.659 (2.775)	-0.193	-1.319
HTKS	0.111 (0.163)	0.160	0.680
HTKS x HLEQ: PI Interaction	0.037 (0.042)	0.241	0.862

Note. Key: *= $p < .05$, *SE* = standard error.

Table 7

Multiple Regression: HTKS Scores Predicting MCAS: Math Scores in 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	484.422 (2.975)		162.830*
Child's Sex	0.205 (3.456)	0.005	0.059
Race/Ethnicity: White	7.058 (4.159)	0.146	1.697
Race/Ethnicity: Black	-5.121 (4.513)	-0.096	-1.135
Race/Ethnicity: Other	-2.781 (6.451)	-0.035	-0.431
Model 2			
(Constant)	472.205		96.277*
Child's Sex	-2.260 (3.303)	-0.051	-0.684
Race/Ethnicity: White	4.053 (3.964)	0.084	1.022
Race/Ethnicity: Black	-3.397 (4.263)	-0.063	-0.797
Race/Ethnicity: Other	-0.337 (6.094)	-0.004	-0.055
PTI: PC	-2.085 (1.966)	-0.077	-1.060
HTKS	0.278 (.059)	0.355	4.733*
Model 3			
(Constant)	474.576 (7.221)		65.718*
Child's Sex	-2.427 (3.332)	-0.055	-0.728
Race/Ethnicity: White	4.385 (4.042)	0.091	1.085
Race/Ethnicity: Black	-3.103 (4.323)	-0.058	-0.718
Race/Ethnicity: Other	-0.257 (6.111)	-0.003	-0.042
PTI: PC	-3.984 (4.672)	-0.147	-0.853
HTKS	0.236 (0.110)	0.302	2.153*
HTKS x PTI: PC Interaction	0.032 (0.071)	0.093	0.448

Note. Key: *= $p < .05$, *SE* = standard error.

Table 8

Multiple Regression: HTKS Scores Predicting MCAS: Math Scores in 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	485.851 (3.056)		159.005*
Child's Sex	0.387 (3.516)	0.009	-0.110
Race/Ethnicity: White	5.647 (4.255)	0.116	1.327
Race/Ethnicity: Black	-6.256 (4.563)	-0.117	-1.371
Race/Ethnicity: Other	-4.275 (6.510)	-0.054	-0.657
Model 2			
(Constant)	474.252 (7.229)		65.606*
Child's Sex	-1.854 (3.389)	-0.042	-0.547
Race/Ethnicity: White	2.916 (4.126)	0.060	0.707
Race/Ethnicity: Black	-4.184 (4.377)	-0.079	-0.956
Race/Ethnicity: Other	-1.681 (6.219)	-0.021	-0.270
PTI: PI	-1.703 (3.254)	-0.039	-0.523
HTKS	0.267 (0.062)	0.336	4.335*
Model 3			
(Constant)	479.335 (13.220)		36.260*
Child's Sex	-2.066 (3.429)	-0.046	-0.603
Race/Ethnicity: White	3.221 (4.189)	0.066	0.769
Race/Ethnicity: Black	-3.910 (4.428)	-0.073	-0.883
Race/Ethnicity: Other	-1.293 (6.292)	-0.016	-0.205
PTI: PC	-4.782 (7.450)	-0.109	-0.642
HTKS	0.178 (0.203)	0.224	0.874
HTKS x PTI: PI Interaction	0.053 (0.115)	0.139	0.460

Note. Key: *= $p < .05$, *SE* = standard error.

Table 9

Multiple Regression: HTKS Scores Predicting MCAS: Math Scores in 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	486.055 (2.836)		171.373*
Child's Sex	1.480 (3.292)	0.034	0.450
Race/Ethnicity: White	5.837 (3.979)	0.121	1.467
Race/Ethnicity: Black	-5.456 (4.306)	-0.102	-1.267
Race/Ethnicity: Other	-7.390 (5.993)	-0.095	-1.233
Model 2			
(Constant)	476.359 (6.648)		71.650*
Child's Sex	-0.039 (3.162)	-0.001	-0.012
Race/Ethnicity: White	3.612 (3.782)	0.075	0.955
Race/Ethnicity: Black	-3.669 (4.078)	-0.068	-0.900
Race/Ethnicity: Other	-4.551 (5.682)	-0.059	-0.801
HLEQ: PI	-1.386 (1.488)	-0.065	0.353
HTKS	0.272 (0.056)	0.351	4.882*
Model 3			
(Constant)	479.047 (11.902)		40.248*
Child's Sex	-0.189 (3.218)	-0.004	-0.059
Race/Ethnicity: White	3.779 (3.841)	0.079	0.984
Race/Ethnicity: Black	-3.565 (4.106)	-0.066	-0.868
Race/Ethnicity: Other	-4.373 (5.734)	-0.056	-0.763
HLEQ PI	-2.139 (3.138)	-0.101	-0.681
HTKS	0.225 (0.184)	0.290	0.223
HTKS x HLEQ: PI Interaction	0.013 (0.048)	0.077	0.273

Note. Key: *= $p < .05$, *SE* = standard error.

Table 10

Multiple Regression: ERC Scores Predicting MCAS: ELA Scores in 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	489.405 (2.278)		214.807*
Child's Sex	5.435 (2.549)	0.134	2.132*
Race/Ethnicity: White	2.878 (3.003)	0.068	0.958
Race/Ethnicity: Black	-4.607 (3.450)	-0.093	-1.335
Race/Ethnicity: Other	-6.361 (4.724)	-0.089	-1.346
Model 2			
(Constant)	498.159 (5.453)		91.350*
Child's Sex	4.426 (2.607)	0.109	1.697
Race/Ethnicity: White	2.522 (3.011)	0.059	0.837
Race/Ethnicity: Black	-5.010 (3.450)	-0.101	-1.452
Race/Ethnicity: Other	-7.267 (4.745)	-0.102	-1.532
PTI: PC	-1.005 (1.481)	-0.043	-0.679
ERC	-3.722 (2.413)	-0.099	-1.543
Model 3			
(Constant)	492.368 (8.682)		56.712*
Child's Sex	4.309 (2.612)	0.106	1.649
Race/Ethnicity: White	2.753 (3.025)	0.065	0.910
Race/Ethnicity: Black	-5.164 (3.456)	-0.104	-1.494
Race/Ethnicity: Other	-7.299 (4.748)	-0.102	-1.537
PTI: PC	2.999 (4.900)	0.127	0.612
ERC	-0.475 (4.492)	-0.013	-0.106
ERC x PTI: PC Interaction	-2.188 (2.552)	-0.208	-0.857

Note. Key: *= $p < .05$, *SE* = standard error.

Table 11

Multiple Regression: ERC Scores Predicting MCAS: ELA Scores in 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	489.546 (2.262)		216.387*
Child's Sex	5.731 (2.637)	0.144	2.259*
Race/Ethnicity: White	1.722 (3.011)	0.041	0.572
Race/Ethnicity: Black	-3.782 (3.388)	-0.079	-1.116
Race/Ethnicity: Other	-6.597 (4.652)	-0.095	-1.418
Model 2			
(Constant)	503.988 (6.792)		74.206*
Child's Sex	4.868 (2.580)	0.122	1.885
Race/Ethnicity: White	0.987(3.021)	0.024	0.327
Race/Ethnicity: Black	-4.514 (3.382)	-0.095	-1.335
Race/Ethnicity: Other	-7.735 (4.655)	-0.112	-1.662
PTI: PI	-3.232 (2.296)	-0.089	-1.408
ERC	-4.324 (2.388)	-0.117	-1.811
Model 3			
(Constant)	498.406 (15.398)		32.368*
Child's Sex	4.774 (2.594)	0.120	1.840
Race/Ethnicity: White	0.940 (3.028)	0.022	0.310
Race/Ethnicity: Black	-4.514 (3.388)	-0.095	-1.332
Race/Ethnicity: Other	-7.714 (4.663)	-0.111	-1.654
PTI: PI	-0.104 (8.073)	-0.003	-0.013
ERC	-1.243 (7.990)	-0.034	-0.156
ERC x PTI: PI Interaction	-1.714 (4.242)	-0.121	-0.404

Note. Key: *= $p < .05$, *SE* = standard error.

Table 12

Multiple Regression: ERC Scores Predicting MCAS: ELA Scores in 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	490.278 (2.159)		227.104*
Child's Sex	6.457 (2.448)	0.158	2.638*
Race/Ethnicity: White	1.062 (2.882)	0.025	0.369
Race/Ethnicity: Black	-4.611 (3.337)	-0.091	-1.382
Race/Ethnicity: Other	-8.949 (4.511)	-0.125	-1.984*
Model 2			
(Constant)	503.773 (7.084)		71.119*
Child's Sex	5.767 (2.507)	0.141	2.300*
Race/Ethnicity: White	1.227 (2.872)	0.029	0.427
Race/Ethnicity: Black	-4.911 (3.326)	-0.097	-1.476
Race/Ethnicity: Other	-9.320 (4.501)	-0.130	-2.070*
HLEQ: PI	-1.432 (1.207)	-0.072	-1.186
ERC	-4.219 (2.292)	-0.113	-1.841
Model 3			
(Constant)	489.399 (16.346)		29.940*
Child's Sex	5.694 (2.509)	0.140	2.270*
Race/Ethnicity: White	1.014 (2.880)	0.024	0.352
Race/Ethnicity: Black	-4.722 (3.332)	-0.094	-1.417
Race/Ethnicity: Other	-9.220 (4.503)	-0.129	-2.048*
HLEQ: PI	2.331 (4.042)	0.117	0.577
ERC	3.525 (8.261)	0.095	0.427
ERC x HLEQ: PI Interaction	-2.046 (2.097)	-0.264	-0.976

Note. Key: *= $p < .05$, *SE* = standard error.

Table 13

Multiple Regression: ERC Scores Predicting MCAS: Math Scores in 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	484.207 (2.595)		186.583*
Child's Sex	0.998 (2.908)	0.022	0.343
Race/Ethnicity: White	6.017 (3.432)	0.125	1.753
Race/Ethnicity: Black	-2.640 (3.928)	-0.047	-0.672
Race/Ethnicity: Other	-5.752 (5.379)	-0.071	-1.069
Model 2			
(Constant)	499.980 (6.157)		81.209*
Child's Sex	-0.862 (2.948)	-0.019	-0.292
Race/Ethnicity: White	5.521 (5.408)	0.115	1.620
Race/Ethnicity: Black	-3.371 (3.890)	-0.060	-0.867
Race/Ethnicity: Other	-7.457 (5.351)	-0.092	-1.394
PTI: PC	-1.170 (1.671)	-0.044	-0.700
ERC	-7.168 (2.725)	-0.169	-2.631*
Model 3			
(Constant)	494.148 (9.794)		50.453*
Child's Sex	-0.984 (2.955)	-0.021	-0.333
Race/Ethnicity: White	5.759 (3.425)	0.119	1.681
Race/Ethnicity: Black	-3.526 (3.899)	-0.063	-0.904
Race/Ethnicity: Other	-7.490 (5.356)	-0.093	-1.398
PTI: PC	2.686 (5.530)	0.108	0.519
ERC	-3.897 (5.067)	-0.092	-0.769
ERC x PTI: PC Interaction	-2.206 (2.879)	-0.186	-0.766

Note. Key: *= $p < .05$, *SE* = standard error.

Table 14

Multiple Regression: ERC Scores Predicting MCAS: Math Scores in 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Beta	*t*
(Constant)	484.372 (2.592)		186.889*
Child's Sex	1.434 (2.912)	0.032	0.492
Race/Ethnicity: White	5.026 (3.461)	0.105	1.452
Race/Ethnicity: Black	-2.626 (3.880)	-0.048	-0.677
Race/Ethnicity: Other	-6.056 (5.327)	-0.077	-1.137
Model 2			
(Constant)	504.966 (7.716)		65.445*
Child's Sex	-0.211 (2.940)	-0.005	-0.072
Race/Ethnicity: White	4.217 (3.446)	0.088	1.224
Race/Ethnicity: Black	-3.662 (3.842)	-0.068	-0.953
Race/Ethnicity: Other	-7.928 (5.288)	-0.101	-1.499
PTI: PI	-3.059 (2.611)	-0.074	-1.172
ERC	-7.621 (2.716)	-0.181	-2.806*
Model 3			
(Constant)	509.653 (17.496)		29.129*
Child's Sex	-0.135 (2.956)	-0.003	-0.046
Race/Ethnicity: White	4.254 (3.455)	0.089	1.231
Race/Ethnicity: Black	-3.663 (3.849)	-0.068	-0.952
Race/Ethnicity: Other	-7.945 (5.299)	-0.101	-1.500
PTI: PI	-5.686 (9.178)	-0.138	-0.620
ERC	-10.207 (9.078)	-0.243	-1.124
ERC x PTI: PI Interaction	1.440 (4.821)	0.090	0.299

Note. Key: *= $p < .05$, *SE* = standard error.

Table 15

Multiple Regression: ERC Scores Predicting MCAS: Math Scores in 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	***B (SE)***	**Beta**	***t***
(Constant)	485.530 (2.436)		199.340*
Child's Sex	2.381 (2.766)	0.052	0.861
Race/Ethnicity: White	3.576 (3.262)	0.075	1.096
Race/Ethnicity: Black	-3.098 (3.764)	-0.055	-0.823
Race/Ethnicity: Other	-9.006 (5.087)	-0.113	-1.770
Model 2			
(Constant)	512.936 (7.857)		65.287*
Child's Sex	0.965 (2.784)	0.021	-0.346
Race/Ethnicity: White	3.964 (3.192)	0.083	1.242
Race/Ethnicity: Black	-3.702 (3.684)	-0.066	-1.005
Race/Ethnicity: Other	-9.748 (4.985)	-0.122	-1.955
HLEQ: PI	-2.934 (1.337)	-0.132	-2.194*
ERC	-8.512 (2.542)	-0.205	-3.349*
Model 3			
(Constant)	509.767 (18.154)		28.081*
Child's Sex	0.950 (2.790)	0.021	0.340
Race/Ethnicity: White	3.916 (3.208)	0.082	1.221
Race/Ethnicity: Black	-3.661 (3.696)	-0.065	-0.990
Race/Ethnicity: Other	-7.490 (5.356)	-0.093	-1.398
HLEQ: PI	-2.105 (4.486)	-0.095	-0.469
ERC	-6.805 (9.171)	-0.164	-0.742
ERC x HLEQ: PI Interaction	-0.451 (2.327)	-0.052	-0.194

Note. Key: *= $p < .05$, *SE* = standard error.

Table 16

Logistic Regression: HTKS Scores Predicting Chronic Absenteeism 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-2.477 (1.041)*	5.663	0.084		
Child's Sex	-0.575 (0.396)	2.111	0.562	0.259	1.222
Race/Ethnicity: White	1.279 (1.093)	1.592	3.970	0.466	33.803
Race/Ethnicity: Black	0.788 (1.145)	0.474	2.200	0.233	20.734
Race/Ethnicity: Hispanic	1.305 (1.075)	1.472	3.686	0.448	30.322
Model 2					
(Constant)	-2.647 (1.152)*	5.284	0.071		
Child's Sex	-0.493 (0.404)	1.491	0.611	0.277	1.348
Race/Ethnicity: White	1.530 (1.104)	1.919	4.617	0.530	40.205
Race/Ethnicity: Black	0.812 (1.148)	0.501	2.253	0.237	21.384
Race/Ethnicity: Hispanic	1.389 (1.080)	1.654	4.010	0.483	33.284
HTKS	-0.005 (0.007)	0.508	0.995	0.982	1.009
PTI: PC	0.256 (0.233)	1.210	1.291	0.819	2.037
Model 3					
(Constant)	-2.733 (1.331)*	4.218	.065		
Child's Sex	-0.488 (0.407)	1.438	0.614	0.277	1.363
Race/Ethnicity: White	1.521 (1.107)	1.889	4.577	0.523	40.038
Race/Ethnicity: Black	0.803 (1.150)	0.487	2.232	0.234	21.284
Race/Ethnicity: Hispanic	1.389 (1.080)	1.655	4.012	0.483	33.321
HTKS	-0.003 (0.014)	0.065	0.997	0.970	1.023
PTI: PC	0.319 (0.540)	0.349	1.376	0.478	3.962
HTKS x PTI: PC Interaction	-0.001 (0.008)	0.017	0.999	0.983	1.015

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 17

Logistic Regression: HTKS Scores Predicting Chronic Absenteeism 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-2.437 (1.042)*	5.475	0.087		
Child Sex	-0.760 (0.416)	3.345	0.468	0.207	1.056
Race/Ethnicity: White	1.466 (1.095)	1.792	4.330	0.506	37.021
Race/Ethnicity: Black	0.545 (1.167)	0.218	1.724	0.175	16.975
Race/Ethnicity: Hispanic	1.292 (1.079)	1.433	3.639	0.439	30.156
Model 2					
(Constant)	-1.954 (1.312)	2.218	0.142		
Child's Sex	-0.704 (0.422)	2.785	0.495	0.216	1.131
Race/Ethnicity: White	1.577 (1.105)	2.035	4.840	0.554	42.252
Race/Ethnicity: Black	0.521 (1.168)	0.199	1.684	0.171	16.628
Race/Ethnicity: Hispanic	1.337 (1.081)	1.528	3.807	0.457	31.692
HTKS	-0.006 (0.007)	0.798	0.994	0.980	1.008
PTI: PI	-0.103 (0.409)	0.063	0.903	0.405	2.014
Model 3					
(Constant)	-1.765 (1.869)	0.892	0.171		
Child's Sex	-0.707 (0.422)	2.802	0.493	0.216	1.128
Race/Ethnicity: White	1.572 (1.106)	2.021	4.815	0.551	42.048
Race/Ethnicity: Black	0.519 (1.168)	0.198	1.681	0.170	16.589
Race/Ethnicity: Hispanic	1.324 (1.084)	1.492	3.760	0.449	31.499
HTKS	-0.010 (0.024)	0.162	0.990	0.945	1.038
PTI: PI	-0.207 (0.850)	0.059	0.813	0.154	4.303
HTKS x PTI: PI Interaction	0.002 (0.013)	0.020	1.002	0.976	1.029

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 18

Logistic Regression: HTKS Scores Predicting Chronic Absenteeism 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-2.501 (1.042)*	5.760	0.082		
Child's Sex	-0.543 (0.383)	2.010	0.581	0.274	1.231
Race/Ethnicity: White	1.313 (1.087)	1.459	3.716	0.442	31.250
Race/Ethnicity: Black	0.718 (1.140)	0.397	2.051	0.220	19.154
Race/Ethnicity: Hispanic	1.368 (1.069)	1.638	3.926	0.484	31.874
Model 2					
(Constant)	-2.612 (1.265)*	4.262	0.073		
Child's Sex	-0.544 (0.388)	1.962	0.581	0.271	1.242
Race/Ethnicity: White	1.337 (1.095)	1.491	3.806	0.445	32.529
Race/Ethnicity: Black	0.713 (1.140)	0.391	2.041	0.218	19.079
Race/Ethnicity: Hispanic	1.380 (1.070)	1.662	3.974	0.488	32.385
HTKS	-0.001 (0.007)	0.034	0.999	0.986	1.012
HLEQ: PI	0.045 (0.176)	0.064	1.046	0.740	1.477
Model 3					
(Constant)	-1.376 (1.685)	0.667	0.253		
Child's Sex	-.603 (0.393)	2.350	0.547	0.253	1.183
Race/Ethnicity: White	1.329 (1.097)	1.470	3.779	0.441	32.411
Race/Ethnicity: Black	0.698 (1.141)	0.374	2.009	0.215	18.812
Race/Ethnicity: Hispanic	1.312 (1.074)	1.493	3.714	0.453	30.468
HTKS	-0.022 (0.021)	1.140	0.978	0.939	1.019
HLEQ: PI	-0.284 (0.350)	0.656	0.753	0.379	1.496
HTKS x HLEQ: PI Interaction	0.006 (0.005)	1.123	1.006	0.995	1.017

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 19

Logistic Regression: ERC Scores Predicting Chronic Absenteeism 3rd Grade Using PTI: PC as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-1.547 (0.554)*	7.791	0.213		
Child's Sex	-0.227 (0.314)	0.521	0.797	0.431	1.475
Race/Ethnicity: White	0.245 (0.606)	0.164	1.278	0.390	4.189
Race/Ethnicity: Black	-0.209 (0.671)	0.097	0.812	0.218	3.023
Race/Ethnicity: Hispanic	0.085 (0.602)	0.200	1.088	0.335	3.540
Model 2					
(Constant)	-2.162 (0.771)*	7.863	0.115		
Child's Sex	-0.147 (0.323)	0.207	0.863	0.458	1.626
Race/Ethnicity: White	.222 (0.611)	0.132	1.248	0.377	4.131
Race/Ethnicity: Black	-0.227 (0.674)	0.113	0.797	0.212	2.989
Race/Ethnicity: Hispanic	0.034 (0.607)	0.003	1.035	0.315	3.398
ERC	0.242 (0.281)	0.738	1.273	0.734	2.210
PTI: PC	0.128 (0.178)	0.514	1.136	0.801	1.611
Model 3					
(Constant)	-1.115 (1.157)	0.929	0.328		
Child's Sex	-0.145 (0.324)	0.200	0.865	0.459	1.632
Race/Ethnicity: White	0.162 (0.613)	0.070	1.176	0.354	3.914
Race/Ethnicity: Black	-0.208 (0.675)	0.094	0.813	0.216	3.053
Race/Ethnicity: Hispanic	0.014 (0.608)	0.001	1.015	0.308	3.342
ERC	-0.321 (0.550)	0.340	0.726	0.247	2.134
PTI: PC	-0.559 (0.600)	0.869	0.572	0.176	1.853
ERC x PTI: PC Interaction	0.364 (0.302)	1.457	1.439	0.797	2.600

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 20

Logistic Regression: ERC Scores Predicting Chronic Absenteeism 3rd Grade Using PTI: PI as a Moderator
Controlling for Child's Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. Lower	For Exp(*B*) Upper
(Constant)	-1.513 (0.554)*	7.453	0.220		
Child's Sex	-0.361 (0.321)	1.265	0.697	0.371	1.308
Race/Ethnicity: White	0.323 (0.607)	0.283	1.381	0.420	4.539
Race/Ethnicity: Black	-0.353 (0.684)	0.267	0.702	0.184	2.683
Race/Ethnicity: Hispanic	0.128 (0.603)	0.045	1.136	0.349	3.702
Model 2					
(Constant)	-1.610 (0.931)	2.994	0.084		
Child's Sex	-0.299 (0.330)	0.820	0.742	0.389	1.416
Race/Ethnicity: White	0.253 (0.613)	0.171	1.288	0.388	4.279
Race/Ethnicity: Black	-0.404 (0.688)	0.345	0.668	0.173	2.570
Race/Ethnicity: Hispanic	0.069 (0.608)	0.013	1.071	0.325	3.529
ERC	0.288 (0.282)	1.037	1.333	0.766	2.319
PTI: PI	-0.228 (0.296)	0.594	0.796	0.446	1.422
Model 3					
(Constant)	-1.872 (1.901)	0.970	0.154		
Child's Sex	-0.302 (0.330)	0.834	0.740	0.387	1.413
Race/Ethnicity: White	0.246 (0.614)	0.161	1.279	0.384	4.260
Race/Ethnicity: Black	-0.405 (0.688)	0.347	0.667	0.173	2.566
Race/Ethnicity: Hispanic	0.064 (0.609)	0.011	1.066	0.323	3.515
ERC	0.428 (0.933)	0.211	1.535	0.246	9.558
PTI: PI	-0.075 (1.014)	0.005	0.928	0.127	6.772
ERC x PTI: PI Interaction	-0.081 (0.513)	0.025	0.922	0.338	2.519

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Table 21

Logistic Regression: ERC Scores Predicting Chronic Absenteeism 3rd Grade Using HLEQ: PI as a Moderator
Controlling for Child Sex and Mother's Race/Ethnicity (n = 158)

Model 1	*B (SE)*	Wald Statistic	Odds Ratio Exp(*B*)	95% C.I. For Exp(*B*) Lower	Upper
(Constant)	-1.546 (0.554)*	7.783	0.213		
Child's Sex	-0.336 (0.299)	1.261	0.715	0.397	1.285
Race/Ethnicity: White	0.303 (0.597)	0.258	1.354	0.420	4.369
Race/Ethnicity: Black	-0.201 (0.667)	0.090	0.818	0.222	3.023
Race/Ethnicity: Hispanic	0.205 (0.592)	0.120	1.228	0.385	3.916
Model 2					
(Constant)	-2.085 (0.953)*	4.786	0.124		
Child's Sex	-0.276 (0.306)	0.811	0.759	0.417	1.383
Race/Ethnicity: White	0.282 (0.599)	0.221	1.326	0.410	4.291
Race/Ethnicity: Black	-0.216 (0.669)	0.105	0.805	0.217	2.986
Race/Ethnicity: Hispanic	0.179 (0.594)	0.090	1.196	0.373	3.829
ERC	0.272 (0.261)	1.087	1.313	0.787	2.190
HLEQ: PI	0.009 (0.143)	0.004	1.010	0.763	1.335
Model 3					
(Constant)	-3.124 (1.916)	2.658	0.044		
Child's Sex	-0.286 (0.307)	0.869	0.751	0.412	1.370
Race/Ethnicity: White	0.268 (0.599)	0.199	1.307	0.404	4.230
Race/Ethnicity: Black	-0.208 (0.668)	0.097	0.812	0.219	3.010
Race/Ethnicity: Hispanic	0.168 (0.594)	0.080	1.183	0.369	3.786
ERC	0.821 (0.909)	0.816	2.272	0.383	13.491
HLEQ: PI	0.290 (0.470)	0.381	1.337	0.532	3.357
ERC x HLEQ: PI Interaction	-0.148 (0.236)	0.394	0.862	0.543	1.369

Note. Key: *= $p < .05$, *SE* = standard error, C.I. = confidence interval

Figures

Figure 1

Bronfenbrenner's Ecological Systems Theory Model

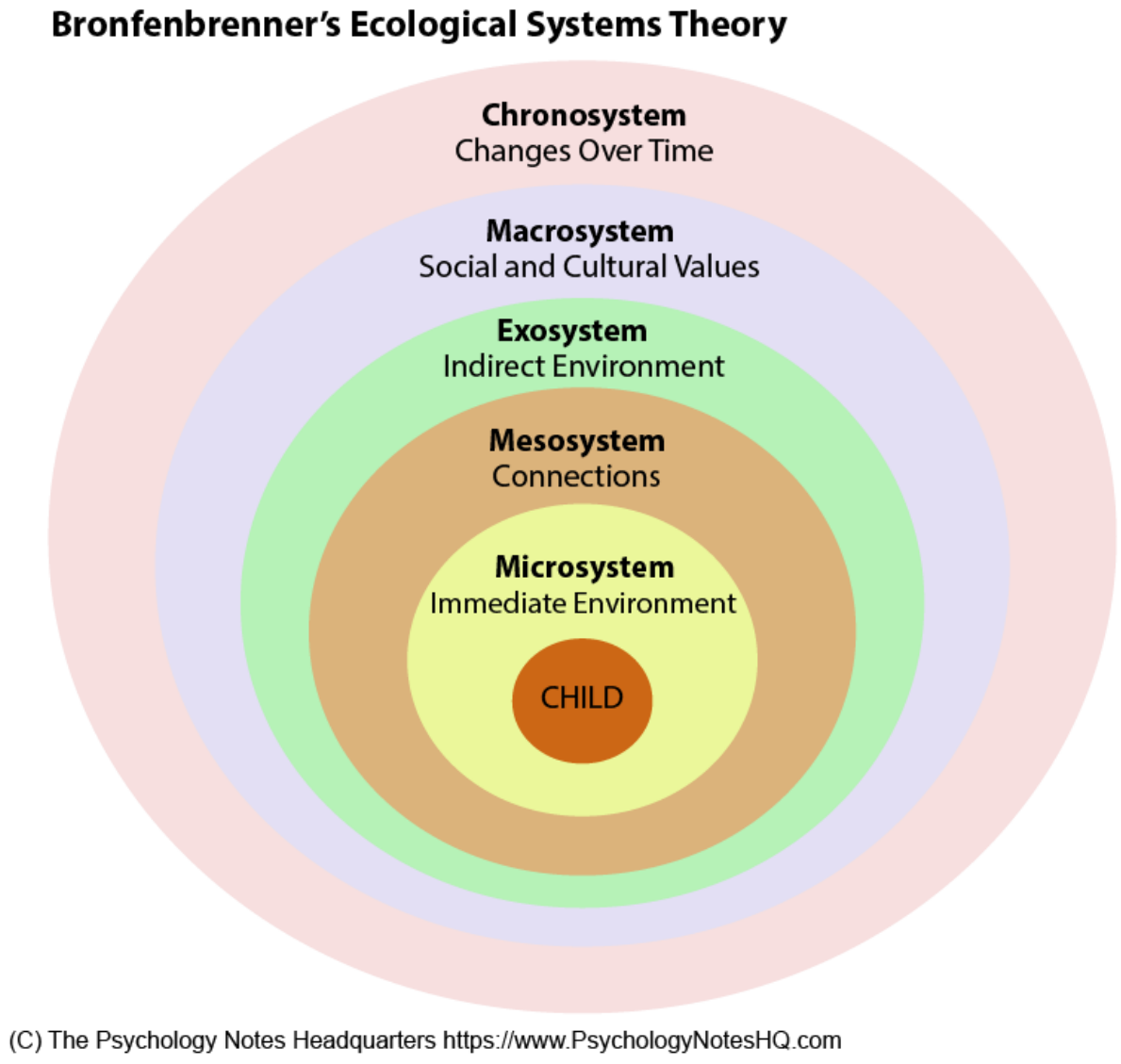
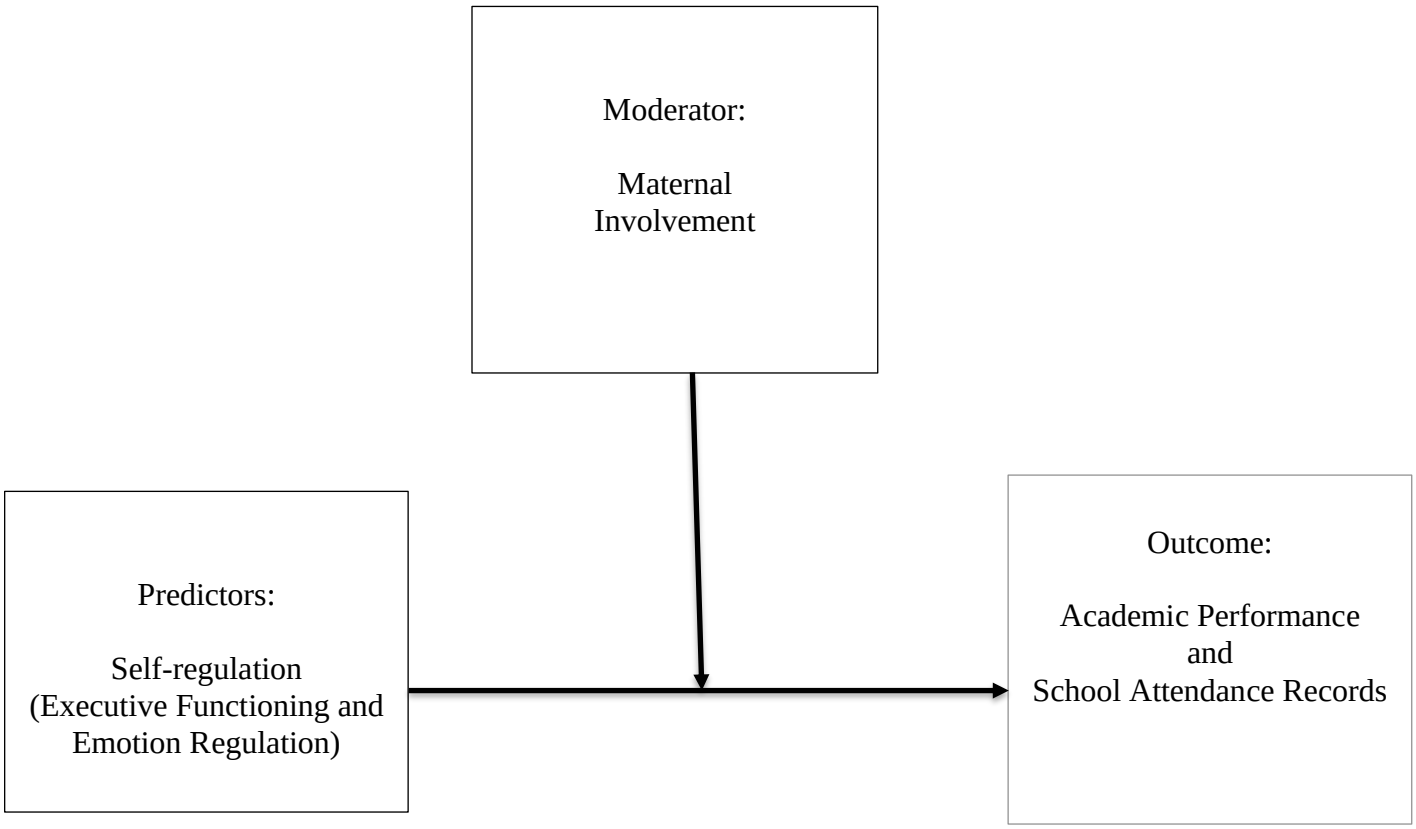


Figure 2

Research Model



Early Self-Regulation Skills and Maternal Involvement Influencing Academic Performance and School Attendance

A child's ability to self-regulate in academic and social settings is crucial to academic, professional, and personal success. Children's self-regulation refers to the ability to control and moderate cognitive and social impulses and behaviors in an appropriate manner based on certain settings or circumstances in which children are involved (Geeraerts et al., 2019). If a child is unable to utilize appropriate and healthy coping mechanisms during conflicts or unable to have an effective, reciprocal conversation with another person, then it might be difficult to take the next step in doing more advanced tasks, such as learning new academic concepts in a math class (Domitrovich et al., 2017). A child's competency in self-regulation forms the basis for effective communication and collaboration skills that lead to academic and personal success.

There are high drop-out rates for high school students in the United States and these drop-out rates are often results of poor school attendance and academic performance that may have their beginnings in early elementary school (Hamilton, 2010; McIntyre, 2013). In the United States, about two-thirds of students graduate with a high school diploma in four years, while only half of those students are African American, Latino, and Native American (Hamilton, 2010). A crucial component causing these high school drop-out rates derive from children's poor academic performance, specifically in reading, and living in poverty (McIntyre, 2013). According to McIntyre (2013), "Students who do not read on grade level by grade three are four times more likely to dropout and students who are not reading on grade level and living in poverty are thirteen times more likely to drop out of school (Sparks, 2011)." Along with poor academic performance in elementary school possibly leading to dropping out of high school in the future, living in poverty can also lead to dropping out of high school. Living in poverty can

make an impact because these children and their families might not have access to academic and personal resources or might not have access to safe and appropriate transportation to help with their commute to school (McIntyre, 2013). Families from low-income backgrounds might simply not have a personal vehicle, have the time to take their children to school through public transportation due to their own work schedule, or not be living in a neighborhood that is safe or even close enough for their children to walk to school on their own (McIntyre, 2013). These possible barriers caused by living in poverty can prevent them from attending school regularly, gaining those academic and social experiences, and resulting in poor attendance records, which can then lead to dropping out of high school in the future.

Some predictors of children having poor school attendance and academic performance derive from experiences that occur even before formal education, such as experiences within their household with family members or caregivers (McIntyre, 2013). Inconsistent parenting practices, insufficient parental guidance, and lack of nurturing and emotionally and physically present interactions have been associated with challenges for children developing low self-regulation abilities. This then can lead to children struggling in managing their emotions when encountering social and academic challenges in the school setting (Hamilton, 2010; Armstrong, 2012; Hardaway et al., 2012; Newland, 2015). Parents want to support their children and help them thrive; however, sometimes parents face many stressors, including the lack of economic resources and support systems, as well as other forms of adversity, discrimination, and judgement along the way (Hill, 2018; Luster et al., 2004). These multiple stressors can be in the form of neighborhood violence, being discriminated against by school systems, being shamed by family and friends, and not having supportive resources readily accessible (Morrissey et al., 2014; Muniz et al., 2014; Oberle et al., 2018). Each of these challenges that parents and children

face can impact children's emerging self-regulation skills and their educational trajectories. Therefore, discovering ways to support and strengthen children's self-regulation, academic performance, and school attendance in early elementary school can help teachers, families, and professionals implement effective intervention strategies to help prevent poor self-regulation, academic performance, and school attendance in the future.

Since early elementary experiences and interactions between the children, their parents, and school systems impact children's self-regulation, academic performance, and school attendance, these aspects were examined through an ecological perspective by investigating how aspects within the microsystem and mesosystem of children's lives influence each other (Eketal & Mahoney, 2017). The microsystem consists of settings where children have direct interactions, such as with family, peers, school, and neighborhoods. (Eketal & Mahoney, 2017). The mesosystem consists of multiple microsystems in the children's life intertwining with each other, such as when the home and school environment interact with each other through a parent-teacher conference (Eketal & Mahoney, 2017).

In addition to investigating the associations between children's self-regulation and educational experiences, I also examined interactions within the mesosystem, specifically how adolescent mothers who come from low-income backgrounds might have an impact in their children's academic performance and school attendance by involvement with their children's schools. Parental involvement and engagement consist of a parent actively communicating with their children's teachers by discussing student learning goals or discussing ways of how they can be directly or indirectly involved in their child's school experiences, such as volunteering for school events or helping their children with homework (Huntsinger & Jose, 2009). When parents are actively involved and engaged in their children's schoolwork or experiences, it can help

motivate the child to be engaged and interested in their own schoolwork (Huntsinger & Jose, 2009). When children become more engaged and interested in reaching goals and doing well in school, this can help boost their confidence and motivation in attempting to learn new things and solve problems (Geeraerts et al., 2019; Huntsinger & Jose, 2009; Morrissey et al., 2014; Muniz et al., 2014; Oberele et al., 2018). When they develop greater confidence and competence in taking on new and possibly more challenging tasks, this supports and strengthens their abilities to regulate their emotions when encountering a challenging obstacle. Being able to successfully regulate their emotions during a stressful time of encountering something new or challenging can help them develop the necessary tools for learning and understanding new academic material covered in school (Armstrong, 2012; Jones et al., 2015; Newland, 2015).

The following study examined what has already been discussed in previous literature regarding early social-emotional development, parent-child interactions, and children's academic experiences in the school setting. I also discussed some of the gaps in the literature on how self-regulation established in early childhood influences children's academic performance and school attendance records and how adolescent mothers who come from low-income backgrounds may impact on their children's academic performance and school attendance by involvement with their children's school. I used Bronfenbrenner's ecological systems theory as a framework to explain how the microsystem and mesosystem collaborate in order to make an impact on children's academic performance and school attendance. After stating my research questions and hypotheses, I used the findings of this study to explain how the results supported or rejected the original hypotheses and how they helped spark new thoughts and ideas for future directions.

Review of Literature

Self-Regulation Development Begins During Infancy

Early self-regulation involves developing the ability to moderate the occurrence, experience, and expression of emotions that an infant might be experiencing (Thomas et al., 2017). With limited cognitive and motor abilities, infants usually have a difficult time regulating their emotions and often rely on their caregivers' responses during a time of emotional distress to help them develop emerging self-regulation skills (Thomas et al., 2017). Emotions (such as distress, sadness, and anger) and emotion regulation in infancy affect socio-emotional development and are influenced by interactions with caregivers. When infants cry and there is a delay of gratification from their parent, they will most likely exhibit increased anger (Razza et al., 2012). This lack of or delayed sense of gratification from the infants' caregivers can cause them to not get their needs met and this is an important component that affects development in infancy. During these situations, infants express and practice their ability to calm down during times of distress but can usually effectively accomplish successful self-calming practices when their caregivers take action to provide the necessary, nurturing supports during times of emotional distress (Bridgett et al., 2013).

Experiencing prolonged anger with little to no resolutions during infancy has been a strong predictor of children developing self-regulation problems in early childhood (Razza et al., 2012). For example, if infants continue to cry and a caregiver does not comfort them or let them know that they are close by, the infants might develop a weak sense of trust in their caregivers due to this inconsistency with instant gratification. As infants emerge into early childhood, these infancy experiences with anger and confusion might cause them to experience difficulty exhibiting self-regulation skills and effective communication strategies (Razza et al., 2012). Children's experiences with anger and how caregivers respond to it can make an impact on their self-regulation abilities when they reach early childhood and begin to develop more complex

self-regulation abilities as language development and awareness of self and others becomes more relevant (Domitrovich et al, 2017).

Impacts on Parenting Style

Although there are various other types of parenting styles that have been examined in the literature, parents' parenting strategies can be impacted by their own self-regulation abilities and can vary between what have been distinguished as authoritarian or authoritative parenting styles. The authoritarian parenting style relates to limiting the children's independence, implementing a lot of restrictive and hostile interactions with their children when something goes wrong, and not exhibiting a lot of warmth and comforting behaviors (Liu et al., 2018). When children grow up in families with authoritarian parents, it may be harder to develop effective social-emotional competencies, such as self-regulation and being responsible and independent outside of their home, so they are at higher risk to struggle in this area during emerging adulthood (Shen et al., 2018). On the other hand, the authoritative parenting style encourages their children to take risks and be independent while still implementing appropriate limits in a warm and accepting manner (Sartaj & Slam, 2010). Children who grow up with authoritative parents will most likely experience various opportunities to explore independence and experience these encounters in a safe and welcoming environment that can help them grow in their social-emotional development, which can lead them to become adults with high self-regulation competencies.

Parents' own self-regulation abilities often influence which type of parenting style they choose to use. Parents with weak self-regulation abilities most likely will be drawn to the authoritarian parenting style because the lack of control they have on their own autonomy and independence causes them to eagerly want to gain more control over their children (Shen et al, 2018). In contrast, parents with stronger self-regulation skills most likely will gear towards the

authoritative parenting style because their sense of control they have on their own autonomy and emotions can help them develop parenting practices that implement appropriate boundaries and nurturance (Lui et al, 2018). With these factors in mind, parents' weak or strong self-regulation abilities emulate their parenting approaches towards their children and can negatively or positively affect their children's self-regulation development.

Different aspects of families' culture, such as cultural background and environment, can also impact how they develop certain self-regulation abilities and parenting strategies. For example, an Eastern culture, such as Chinese culture, can have a traditional value on having their children show obedience and respect towards others, especially towards adults at home and at school (Liu et al., 2018). This traditional upbringing philosophy can relate to more Western authoritarian parenting strategies that implement more strict demands while lacking warm and nurturing caregiver-child interactions (Liu et al., 2018; Shen et al., 2018). This traditional Chinese culture parenting philosophy is more commonly used in order to make sure their children are exemplifying strong academic achievement because eastern cultures' economies have an emphasis on how obtaining academic success in elementary school can lead to higher education, which can lead to prestigious careers and establishing a respected reputation for their family (Lui et al., 2018). While these traditional Chinese culture practices might appear as negative through a Western culture's lens due to the various similarities relating to authoritarian parenting, these parenting practices are actually favored in Chinese cultural and societal contexts (Tseng, 2013).

While Chinese culture values children to learn and exemplify obedience and respect without questioning authority figures, Western culture values children to develop independence and autonomy. Developing independence and autonomy can lead to opportunities to practice and

implement effective decision-making and collaborative communication skills, which is derived from the guidance from authoritative parenting (Liu et al., 2018; Shen et al., 2018; Tseng, 2013). These two different frameworks representing Eastern and Western cultures both have very different philosophies and beliefs when it comes to distinguishing the most effective parenting strategies to guide their children towards success. According to these generalizations between Eastern and Western cultures, there are variations both within and between cultural traditions in how they are applied in family contexts, so these characteristics associated with the different cultures and parenting styles might not necessarily always apply to all families within that specific culture. This represents how differing cultural traditions in general may influence parenting beliefs and behaviors based on the type of environment or context that these parenting strategies are being portrayed in.

Emotional Based Language Approach with Parent-Child Interactions

In relation to parents being able to regulate their own emotions that can impact parenting styles, it is also important that mothers are able to support their children's self-regulation skills through modeling appropriate emotional based language approaches that guide children on how to act on certain emotions (Armstrong, 2012). Many parents might discuss with their children that it is important for them to understand that it is helpful to express their emotions comfortably and openly through words, but it should also be emphasized that acting on these emotions through self-regulation strategies and coping mechanisms are also important components of supporting children's social-emotional development (Armstrong, 2012). For example, a child can verbally express, "I am sad that I cannot go to the park." However, teaching children ways on how they can act on these emotions can be helpful, such as teaching them to think of alternate ways they can have fun at home since they cannot go to the park (Newland, 2015). These

emotional language techniques can help children develop an understanding of how to feel, what to say, and what to do about that feeling based on past experiences and can act on these similar situations that have previously happened for future situations (Armstrong, 2012; Newland, 2015).

When children are able to understand and act on their own emotions, they will most likely be able to develop a sense of empathy towards others and be able to understand or notice how other people might be feeling (Geeraerts et al., 2019). Children are most likely able to practice their competency in these skills through active practice and daily observation from their parents modeling these self-regulation emotional awareness techniques (Kiff et al., 2011; Reynolds et al., 2017). Therefore, it would be beneficial for parents to intertwine these emotional based language approaches into daily parental interactions with their children if their goal is to help their children to have an effective practice and exposure in emotional based language techniques.

Mothers' Academic and Personal Backgrounds Impact Children's Academic Performance

Certain characteristics of maternal and family environments are associated with children's academic performance. Children who are born to adolescent mothers are most likely to experience developmental challenges, such as poor self-regulation or cognitive abilities that impact academic performance. Since many adolescent mothers drop out of high school temporarily and might not have access to the most beneficial emotional and financial support, raising their children as an adolescent themselves can become challenging (Lipman et al., 2011; SmithBattle & Freed, 2016). These challenges can also include experiencing discrimination and judgement from their own school, social, and professional experiences (Hill, 2010; Lipman et al., 2011). Adolescent mothers might not have had the most enjoyable and successful experiences as

a student due to the low expectations that teachers might have had for them or the lack of effort in supporting them with their academic and social development in the school setting (Hill, 2010; Lipman et al., 2011). These unenjoyable school experiences might cause adolescent mothers to develop a negative perception towards schools and not feel like it is an important and positive factor to help support their children's development. Due to these challenging experiences, this could lead them to developing negative perspectives toward schools, this can lead to their children developing poor academic performance, poor school attendance, self-regulation difficulties, and eventually leading to obtaining a low socioeconomic status when they become adults (Lipman et al., 2011).

Along with the lack of support to help their mental health and financial stability, adolescent mothers are parenting during a time when their own brains are still developing. During adolescence, the prefrontal cortex, which controls decision making, impulse control, and planning, does not fully develop until they reach young adulthood or older (Kelly, 2012). Along with their brain development affecting decision making, their developmental stage also presents challenges related to understanding their role as a new mother and their role as an adolescent (Ford, 2014). Based on Erikson's Psychosocial Theory, the identity formation in adolescence involves adolescents exploring their environments and forming relationships with peers to help them establish an understanding of how they fit in their society (Ford, 2014; Sokol, 2009). When adolescents become pregnant and eventually mothers, this automatically leads them to a pathway that disrupts their exploration during identity development during adolescence and requires them to assimilate to their new role as a mother, which can create a barrier of role confusion due to the conflicting roles of being a mother vs. an adolescent (Ford, 2014; Sokol, 2009).

Self-Regulation Skills Affect Children's Physical and Mental Health

While self-regulation skills make an impact on an individual's relationships with others, they also make an impact on the individual's personal mental and physical health, which can lead to obstacles in achieving social and academic achievement (Hardaway et al., 2012). Children whose families come from low-income backgrounds are at higher risk in facing various stressors and hardships due to the environment they live in and lack of resources that are provided for financial, educational, and emotional support (Hardaway et al, 2012). Because of the potential for toxic stress, these risk factors can cause a child to develop poor self-regulation skills that not only affect their social interactions and academic achievement, but also their physical health and well-being (Finegood, 2019; Newland, 2015).

Not being able to cope with stress and regulate their emotions connecting with relationships or school assignments in a healthy manner can cause children to feel overwhelmed, which may result in turning to unhealthy coping mechanisms (Appleton et al., 2012). For example, if children feel upset about not getting a good grade on an assignment, they might react to this disappointment by utilizing unhealthy coping strategies to regulate their frustration instead of overcoming this hardship by creating a plan to make sure they do better on the next assignment in the future (Appleton et al., 2012; Newland, 2015). Therefore, having the tools to help strengthen and practice self-regulation skills can help children learn how to cope with these stressful situations in a healthier and more appropriate manner, such as learning when to take a break when they get frustrated with a challenging assignment and making a plan on how they can tackle this assignment more effectively after calming down.

Along with poor self-regulation abilities affecting children's academic performance and responses to failure or conflicts, having a physical health barrier can also hinder children's mental health statues by hindering their ability to confidently communicate effectively with peers

(Appleton et al., 2012). These poor physical and mental health statuses can impact each other by developing insecurities from physical health disparities and cause them to not feel comfortable in contributing to social settings due their low self-esteem. Low self-esteem can cause children to feel insecure about asking questions when they need help with a school assignment which can lead to them not comprehending the material effectively and resulting in poor academic performance (Appleton et al., 2012; Orth, Robins, Widaman, & Conger, 2014).

In addition to academic performance determining academic success, children's social interactions with peers and teachers also act as the building blocks of establishing meaningful relationships and experiencing successful and enjoyable academic experiences (Oberle et al, 2018; Orth et al., 2014). These experiences can also be hindered because their low self-esteem might cause them to feel intimidated or insecure about reaching out and connecting with peers in a friendly and casual manner, such as at recess or during lunch time (Oberele et al., 2018; Orth et al., 2014). This lack of confidence regarding the social aspect of peer and teacher connections at school can affect children's motivation to come to school and impede in their school attendance records (Oberele et al., 2018; Orth et al., 2014). When they do not attend school regularly, this will prevent them from having access to these opportunities of social and academic growth, which might make them feel like they do not have the necessary social support leading to poor mental health and compromised academic performance.

Self-Regulation Competencies are Necessary for the Next Steps in Academia

Self-regulation and empathy are important skills to obtain because they can affect academic success (Geeraerts et al., 2019). It is crucial that developing self-regulation and empathy towards themselves and others occurs at a young because these abilities and emotional regulation strategies that are established at a young age tend to carry on with children as they

grow older. Therefore, if children do not establish a greater sense of self-regulation and empathy towards others, then that skill deficiency has a higher risk of remaining the same as they grow older (Wilson & Ray, 2018). Along with being able to regulate their emotions and socially connect with others in order to thrive in the classroom setting, executive functioning skills are also important because this requires students to exhibit effective social interactions, pay attention to teachers and lessons, and obtain the ability to control their emotions and impulses in order to be ready to learn academic content (Jones et al., 2015). Children can exhibit these skills by being able to remain calm and utilize coping mechanisms appropriately when they feel frustrated and are struggling with learning new material and obtaining and utilizing tools to ask the teacher questions to help them understand the material more clearly (Armstrong, 2012; Newland, 2015).

Importance of School Attendance in Early Childhood

When children struggle in school, they may not attend school regularly and miss opportunities to strengthen and support their academic and social-emotional development (Morrissey et al., 2014). Simply attending school can help young children navigate and get accustomed to following consistent routines; following consistent routines is beneficial for young children because it helps them understand and feel more at ease when events or tasks are expected and predictable (Muniz et al., 2014). In relation to initially understanding and feeling comfortable about having consistent routines relevant in their life, these factors also contribute to helping children develop effective self-regulation abilities due to gaining more repeated practice with these daily tasks and interactions (Jones et al., 2015).

In addition to consistent routines benefiting children's self-regulation, interacting with teachers and peers that are present in the school setting also helps strengthen their social-emotional development by having the opportunity to make connections with those individuals.

Teachers can act as support systems, guidance, and a sense of security, especially in the early childhood years when children are most likely being away from their families for the first time (Morrissey et al, 2014; Oberele et al., 2018). Along with those teacher-child relationships, peer interactions and relationships are also crucial in supporting children's social-emotional development. These interactions are important in forming meaningful relationships and for learning how to regulate their emotions and communicating in an appropriate and respectful manner when encountering a disagreement or conflict with another child (Geeraerts et al., 2019; Jones et al., 2015; Oberle et al., 2018). Simply being present at school can provide these children with potential opportunities for children to gain practice in strengthening their social-emotional and academic development.

Assessing Academic Performance Through Standardized Testing

The Massachusetts Comprehensive Assessment System (MCAS) exams are intended to evaluate students' abilities to apply their knowledge in certain subjects at their appropriate grade level and examine whether learning and growth is happening based off of Massachusetts state standards (Massachusetts Department of Elementary and Secondary Education, 2017). MCAS exam scores can help teachers and parents identify where a student has high proficiency in a subject, where students might need more support and assistance, and act as a starting point for teachers to adjust and improve their lesson plans for the school year (Massachusetts Department of Elementary and Secondary Education, 2017). MCAS ELA and Math exams have recently transitioned into the "Next Generation MCAS", which is an updated exam that is implemented through a new computer-based format and aims to assess new learning skills, such as deeper understanding, knowledge application, synthesizing, and writing ("Parents' Guide to the MCAS, 2020). These new approaches and topics are intended to help strengthen students' 21st century

skills in order to be effective members in society by providing them with opportunities to expand their problem-solving skills, collaboration skills, deeper critical thinking skills, and being able to self-regulate while communicating during conversations that might evoke difficult discussions and topics (Nehring et al., 2019).

According to the previous literature, a majority of the preparation process for MCAS: ELA and Math exams do not seem to be a separate component of their typical school day; it appears that this content is already embedded into the curriculum throughout the school year and teaching process of elimination strategies for standardized tests are also added into the lessons (Jadallah, 2010; Wasserman, 2013). Along with teaching the actual academic content, 21st century learning skills are also indirectly taught and modeled when the students gain this practice by participating in collaborative small group activities in order to gain and strengthen their problem-solving skills, collaboration skills, and deeper critical thinking skills.

Associations Between Home Literacy Involvement and Literacy Skills in Elementary School

With the help of teachers implementing English Language Arts material (reading, writing, alphabet knowledge, phonemic awareness, etc.) into their daily curriculum to support student learning outcomes and for MCAS exam preparation, children can also benefit from having additional literacy preparation and practice at home through home literacy environments and quality parent-child interactions. Along with teaching and supporting their children's self-regulation abilities, parents can also act as mentors and tutors for their children's literacy development (Kiff et al., 2011; Senechal & LaFevre, 2014). Some ways in which parents can help their children learn and strengthen these literacy skills are through direct and indirect literacy activities (Puglisi et al., 2017; Senechal & LaFevre, 2014). Parents can engage in direct

literacy activities with their children when they directly teach their children about letter sounds or how to sound out words in order to enhance their alphabet knowledge and phonemic awareness (Baroody & Diamond, 2010; Puglisi et al., 2017; Senechal & LaFevre, 2014). Indirect literacy encounters might be demonstrated by parents simply having a conversation with their children or pointing out certain letters and words that they see in their everyday routines, such as street signs, which can help support children's language and alphabet knowledge skills (Baroody & Diamond, 2010; Puglisi et al., 2017; Senechal & LaFevre, 2014).

In addition to simply being actively involved in these literacy enriching interactions, parents' enthusiasm and support can also help strengthen children's literacy abilities because it can help boost the children's confidence and interests in this area. Previous research has shown that having parents present and actively listening to their children practicing reading out loud can help enhance their reading and reading comprehension skills (Senechal & LaFebre, 2014). When parents provide this support, this can help children become more confident and interested, and influence them to participate in reading and writing activities more often and gain more opportunities to strengthen these skills overtime (Baroody & Diamond, 2010; Senechal & LaFevre, 2014). Therefore, simply creating a literacy enriching environment at home with the necessary materials and activities is important, but also having those meaningful parent-child interactions incorporated into those activities can have an even bigger influence on children's literacy development.

Gaps in the Literature

Adolescent Mothers from Low-Income Backgrounds and School Involvement

Previous literature has stated that parental involvement in their children's school makes a positive impact in their children's academic achievement and school attendance, but it does not

specifically focus on adolescent mothers from low-income backgrounds and how their school involvement impacts their children's academic achievement and school attendance. Active parental engagement and involvement in their children's school has helped parents develop an enthusiastic and intriguing mindset towards their children's school-work, which has helped their children become more motivated and engaged in their school-work to lead them on their way to academic success (Hill, 2018; Huntsinger & Jose, 2009; Luster et al., 2004). However, this information does not necessarily relate to adolescent mothers from low-income backgrounds and their specific experiences with their children's school because previous literature has not specifically discussed these findings in related to this population, adolescent mothers from low-income backgrounds.

With various risk factors relevant in adolescent mothers' lives, which are involved in low-income communities, it is also important to examine the possible protective factors in their lives that can help them have the necessary supports and resources to guide their children towards academic success (Hill, 2018; Luster et al., 2004; Morris et al., 2017; Morrisey et al., 2014). Adolescent mothers from low-income backgrounds might be surrounded by a welcoming community that provides them with the necessary social and emotional support as she continues to grow as a mother (Hill, 2018; Luster et al., 2004). That close-knit community from their community possibly help strengthen their relationship with their child to establish that secure mother-child attachment (Hill, 2018; Luster et al., 2004). In addition to having a welcoming community promote healthy mother-child relationships, schools in that community might also be more willing to collaborate and communicate with adolescent mothers and provide them with guidance and opportunities to become more involved in their children's school-work and activities (Hill, 2018; Luster et al., 2004). With this open-minded atmosphere coming from the

community and school systems, this could encourage adolescent mothers to feel more confident and comfortable in becoming actively involved in their children's school. Therefore, examining how adolescent mothers' school involvement impacts their children's academic achievement and school attendance would contribute to new explanations on how maternal involvement in low-income communities can impact their children's academic achievement and school attendance.

Children's Self-Regulation Impacts School Attendance

Previous literature demonstrates that children's effective self-regulation skills can support their academic success, but there is little research about the associations between young children's self-regulation and school attendance (Geeraerts et al., 2019; Jones et al., 2015; Morrissey et al., 2014; Oberele et al., 2018). Regularly attending school has led to positive academic achievement since being physically present at school is the first step to take in order to gain enriching academic and social-emotional experiences inside and outside of the classroom with peers and teachers (Morrissey et al., 2014; Oberele et al., 2018).

When children exhibit poor self-regulation skills, which might be perceived as challenging behavior, this could result in children being expelled or suspended from school (Miller et al., 2017). When students are expelled or suspended from school, they are unable to attend school for a certain amount of time, which will hinder their school attendance records. Therefore, it could be possible that children who enter school with poor self-regulation abilities will be deprived from attending school regularly due to being expelled or suspended as a consequence for exhibiting challenging behavior (Miller et al., 2017). If children who already have poor self-regulation abilities are missing school due to suspension or expulsion, then they are not only being deprived of academic growth, but also losing opportunities to learn how to improve their self-regulation abilities in the school setting. This study examined whether

effective self-regulation skills established in early childhood leads to acceptable school attendance records in elementary school.

Does a Child's Self-Regulation in Early Childhood Predict Standardized Test Scores in Low-Income Elementary Students?

While previous literature discusses how early self-regulation skills predict standardized test scores in older elementary and middle school students, there is a lack of information on whether this is also applicable for students when they are in younger elementary grades. Previous literature has documented that students in 3rd-7th grades experience some type of test anxiety during standardized tests, which results in poor test scores. Many students experience test anxiety is due to having difficulty staying on task and having difficulty organizing and processing information, which are components of self-regulation (Wood et al., 2016). One explanation of why children experience test anxiety is that they are unable to regulate their emotions in a calming manner when they encounter a challenging task, such a taking a standardized test (Geeraerts et al., 2019; Jones et al., 2015; Wood et al., 2016). Self-regulation has been shown to be an important factor in preparing children for academic success because these skills help them learn how to regulate their emotions when they encounter obstacles, such as learning and understanding new academic material (Geeraerts et al., 2019).

Children who come from low-income backgrounds are at greater risk for experiencing ecological hardships due to their socioeconomic status and lack of accessible resources; this can negatively affect their self-regulation development, which can lead to poorer performance on standardized test scores in elementary school (Ettekal, & Mahoney, 2017; Morris et al., 2017; Morrissey et al., 2014). Understanding whether children's self-regulation abilities in early childhood affect school performance and school attendance early in elementary school is

important to the development of preventative strategies to support self-regulation development and positive educational trajectories. This study was designed to investigate these questions.

Summary

Previous literature sources have discussed how children's experiences practicing and developing self-regulation skills in early childhood and maternal school involvement can make an impact on children's academic performance and school attendance records. These human interactions begin during infancy when infants are experiencing different emotions and human interactions for the first time, and the way caregivers respond to their emotions are parts of the building blocks of early self-regulation (Bridgett et al., 2013; Razza et al., 2012). As children continue to grow older, the parents' parenting style, which can be derived from their own upbringing and self-regulation skills, can also impact how children develop self-regulation skills due to the presence or absence of nurturing parenting strategies that incorporate emotional-based language (Armstrong, 2012; Liu et al., 2018). Once children begin to attend school, their mother's actions can impact their academic performance based on the mother's mindset on being involved in her children's schoolwork based on her own availability to actively become involved and her own academic experiences, which could be affected by her current developmental stage and the adversity and discrimination she might have faced within school systems (Ford, 2014; Hill, 2010; Lipman et al., 2011; Sokol, 2009). Although there are many other factors that affect both children's self-regulation, school attendance, and academic performance, this study focused on children whose mothers became parents during adolescence and how the mothers' involvement in their children's school has affected these three aspects.

With caregiving practices acting as an initial step in shaping children's social-emotional development, children then begin to develop and practice their own self-regulation skills, which

are crucial in impacting their mental and physical health overtime (Finegood, 2019; Newland, 2015). Being able to regulate their emotions during these hardships can help them learn how to navigate conflicts with peers appropriately and encounter academic challenges by utilizing problem solving techniques in a healthy way, which can help boost their self-esteem and support their overall mental and physical health (Finegood, 2019; Newland, 2015). Since practicing and strengthening their self-regulation skills is crucial in paving the way to academic success, it is also important that starting in early childhood, children are attending school regularly in order to be accustomed to consistent routines and have the opportunity to experience those social encounters with peers and teachers that can help support their self-regulation skills (Jones et al., 2015).

Current Study

My study addressed the several gaps of literature by: (1) Investigating how children's self-regulation established in early childhood impacts their academic performance and school attendance records in elementary school and (2) examining how adolescent mothers' school involvement might have the potential to break the link between poor self-regulation, school attendance, and academic performance in elementary school. Correlation analyses were conducted in order to evaluate possible associations between early self-regulation skills and academic performance in 3rd grade. Logistic regression analyses were conducted in order to discover possible associations between early self-regulation skills and school attendance records in 3rd grade. Moderation regression analyses were conducted in order to examine if maternal involvement created a change in the association between early self-regulation and academic performance in 3rd grade. Logistic regression analyses with an interaction were conducted in

order to evaluate if maternal involvement created a change in the associations between early self-regulation and school attendance records in 3rd grade.

Theoretical Framework

The theory that has inspired and informed my research questions was Bronfenbrenner's ecological systems theory. As shown in Figure 1, The ecological systems theory discusses how various social encounters and settings that are relevant in children's environment can directly impact the children; these different social encounters and settings can also intertwine with each other to directly or indirectly impact the children (Bronfenbrenner, 1986; Lightfoot et al., 2013). The microsystem consists of the individuals and environment that the children interact with, which could involve their family life at home, teacher connections at school, and peer relationships (Bronfenbrenner, 1986; Lightfoot et al., 2013). The mesosystem consists of the connections between aspects in the microsystem, such as parental involvement with school events and activities (Bronfenbrenner 1986; Lightfoot et al., 2013). The exosystem indirectly makes an impact on children's development, such as how parents' workplace benefits can lead to earning stable wages and health benefits that can most likely lead to providing quality care for their child (Bronfenbrenner, 1986; Lightfoot et al., 2013). The macrosystem consists of values, customs, and resources that affect other systems, such as child-protection laws and regulations that support policies focused on education and access to health care (Bronfenbrenner, 1986; Lightfoot et al., 2013). Lastly, the chronosystem discusses changes cause by events that occur in the children's life, such as experiencing a natural disaster, or parents experiencing economic hardships by losing their jobs (Bronfenbrenner, 1986; Lightfoot et al., 2013). These changes caused by events can make an impact based on how children react to these changes, whether they

react to these changes through resiliency or struggle to cope with their emotions effectively regarding this change.

The two specific ecological systems that my study focused on were the microsystem and mesosystem because my research questions were attempting to examine children's experiences and development regarding academic performance, school attendance, and maternal school involvement (see Figure 2).

Research Questions and Hypotheses

Research Question 1

Are children's high self-regulation skills established in early childhood associated with high academic performance and strong school attendance records in elementary school?

Hypothesis 1. Children's high self-regulation skills established in early childhood will be associated with having high academic performance in elementary school and strong school attendance records.

Research Question 2

Does maternal school involvement moderate the association between self-regulation skills in early childhood and academic attendance and performance in elementary school?

Hypothesis 2. Adolescent mothers' school involvement will moderate the association between self-regulation skills in early childhood and school attendance and academic performance in early elementary school. When mothers are more involved in their children's school, poor self-regulation in early childhood will not predict later academic performance and school attendance.

Method

Study Design

Healthy Families Massachusetts (HFM)

The Healthy Families Massachusetts program was a home visiting program that supported adolescent mothers with various parenting and overall health supports during the early years of parenting with their first-born child. The adolescent mothers who were part of this study did not receive similar services prior to joining this program and were able to begin the program while still pregnant or parenting and can continue participating up until the child's third birthday. These services included in-home parenting support, which aimed to support the following goals: (1) prevent child abuse and neglect by supporting positive, effective parenting, (2) achieve optimal health, growth and development during infancy and early childhood, (3) encourage educational attainment, job, and life skills among parents, (4) prevent repeat pregnancies during the teen years, and (5) promote parental health and well-being.

Massachusetts Healthy Families Evaluation-2: Early Childhood (MHFE-2EC)

The data that will be used for my proposed study will be derived from the second evaluation phase in the Healthy Families Massachusetts program conducted by the Tufts Interdisciplinary Evaluation Research (TIER) team, which is a longitudinal follow up from HFM. Participants of this study were recruited by HFM local and state personnel and researchers at Tufts University. In order to be eligible participants, they had to meet the following requirements: being female, being at least 16 years old during the study, having the ability to speak English and/or Spanish, have not received any HFM services in the past, and having the ability to cognitively provide their informed consent in being active participants in the study. This randomized controlled trial led to eligible participants being randomly assigned to either the treatment group who received home visiting services (HVS) or the control who only received referrals and information regarding parenting and child development (RIO). Participants in both

the treatment group (HVS) and control group (RIO) were invited to participate in HFM evaluation activities through six time points (T1-T6), which is a timespan of approximately eight years. However, the data in my study were derived from data collected at T5 and when the children were in third grade.

Participants

The original sample in the HFM evaluation study included 684 first time, adolescent mothers who were on average about 18.6 years old (*SD* = 1.29). Based on information from the US census at the time, the racial breakdown of these participants during T1 included: 37.1% White, non-Hispanic, 19.4% Black, non-Hispanic, 35.1% Hispanic, and 8.3% other, non-Hispanic. About seventy-four percent of the mothers claimed English as their preferred language and 81.6% were born in the United States.

The sample that was part of my study included mothers who were participants at T5. As shown in Table 1, some background and demographic characteristics for T5 include: 445 total participants, which were mothers who were about 24.9 years-old (*SD* = 1.3) and 36% White, non-Hispanic, 21% Black, non-Hispanic, 36% Hispanic, and 7% Other, non-Hispanic. The average child's age was 6.09 years-old (*SD* = 0.54) who were 52% boys and 48% girls.

In regards to school attendance records, this data was derived from the Massachusetts Department of Elementary and Secondary Education: Student Information Systems (MDESE: SIMS), which includes data for children who met the following requirements: lived in Massachusetts and were enrolled in Massachusetts public or charter schools at any time point between the 2012-2013 and 2018-2019 school years. The SIMS datasets were generated three times per academic year, which were labeled as A, C, and D. "A" data sets include students who were enrolled in school as of October 1, "C" data sets include students who were enrolled in

school as of March 1, and "D" data sets include students who are enrolled on the last day of the school year (Massachusetts State Agency Data Codebook).

In relation to academic performance, these data were also derived from the Massachusetts Department of Elementary and Secondary Education: Massachusetts Comprehensive Assessment System (MDESE: MCAS), which includes data for children who met the following requirements: lived in Massachusetts and were enrolled in Massachusetts public or charter schools between the 2015-2016, 2016-2017, 2017-2018, and 2018-2019 school years. This data relates to the children who were in grades 3-6 during these school years and were tested in Math and English Language in the spring (Massachusetts State Agency Codebook).

Measures

Self-Regulation: Executive Functioning

Head-Toes-Knees- Shoulders (HTKS): T5. Head-Toes-Knees-Shoulders was used to measure behavior regulation in early elementary students, which included inhibitory control, attention, and working memory skills. HTKS is an extension of the original measure, the Head-to-Toes-Task (HTT), which was geared towards younger children and involved the examiner commanding, "Touch your toes" and the child should touch their toes (Ponitz et al., 2008). For this older age group, children were instructed to touch the opposite part of their bodies from what the examiner commanded. For example, if the examiner said, "Touch your head", the child should have touched their toes. Different commands were verbally given in a random order and the examiners did not give any feedback to the child after they exhibited their action or response. The responses were scored with the following point scale: 2 points for each correct response, 1 point for a self-corrected response, which would occur when the child initially exhibits any actions towards an incorrect response, but ends with exhibiting a correct response, and 0 points

for an incorrect response. During this examination, the participant can only move on to the next phase if they receive a score of 4 or more points; if they do not receive 4 or more points, then they do not continue the measure.

This measure consists of two measures: HTT with 10 examination items, including two types of paired commands, such as “touch your head” and “touch your toes” and HTKS with 20 examination items, including new paired commands, such as “head-toes”, “knees-shoulders”, “head-knees”, and “shoulder-toes” (see Table A1). The total score range for HTT are from 0 to 20 points and the total score range for HTKS are from 0 to 40 points. The total score for the whole measure can range from 0 to 60 points.

The three types of scores that were calculated for this measure were the count scores, binary scores, and categorical scores. The count scores were calculated by calculating the sum of scores for the number of correct responses at each level. Each subscale has a range from 0 to 20 points, and the total measure has a range from 0-60 points. If the child does not move on to complete all three phases, then the child receives 0 points for the uncompleted phase or phases. The higher the scores, the greater behavior self-regulation, including inhibitory control, attention, and working memory. The count scores were documented by organizing them under these sections:

1. Sum of points on practice trails
2. Sum of points on Part 1
3. Sum of points on Part 2
4. Sum of points on Part 3
5. Total Number of points for Part 1, 2, and 3
6. Total number of points for Part 1, 2, 3, and practice trials

The binary scores were calculated by applying the rule that participants could move on to the next level only if they received 4 or more points on the previous level. The categorical scores were calculated by combining binary variables to indicate the highest levels the child passed.

Missing Data. The whole task was documented as missing if the child was unable to proceed or make those actions for reasons besides inaccurate responding. Some of these inaccurate responding examples included the child not understanding the task, not being interested or refusing to respond, or having too many distractions from the environment where the evaluation took place.

Psychometric Properties. There has been reports on strong interrater reliability using the HTKS measure. The previous and simpler version of HTKS, Head-to-Toes task, has exhibited convergent validity with teachers' ratings of behavior regulation in the classroom (Ponitz & McClelland, 2009).

Self-Regulation: Emotion Regulation

Emotion Regulation Checklist (ECR): T5. Mothers were instructed to use a rating scale to indicate how often the child exhibits these following behaviors and emotional states: lability/ negativity, intensity, valence, flexibility, and situational appropriateness of emotional expressions. The 4-point rating scale provided these following scale points: 1 = Rarely/Never, 2 = Sometimes, 3 = Often, 4 = Almost Always. The higher the scores resulting from the lability/ negativity subscale indicate greater dysregulation and the higher scores resulting for the emotion regulation subscale indicate better emotion regulation. There were two original subscales, but the research team at TIER created and used their own. The two original, but unused subscales were Lability/Negativity and Emotion Regulation. As shown in Table A2, the subscale created and

used by TIER was Dysregulation; higher scores on the Dysregulation subscale are associated with higher levels of dysregulation/ lower levels of emotion-regulation.

Missing Data. One missing item was allowed on each subscale. Therefore, 14 out of 15 items were scored on the Lability/ Negativity subscale and 7 out of 8 items were scored on the Emotion Regulation subscale.

Psychometric Properties. This measure showed reliability and the Cronbach's alphas relating to the *Dysregulation scale* from the MHFE-2EC are represented in the following: Mothers: T5 = .84.

Maternal Involvement

Parent Teacher Involvement Questionnaire (PTI): T5. The Parent and Teacher Involvement Questionnaire (PTI) is a measure developed by the Fast Track Project to gauge the relationship between parents and teachers (Miller-Johnson & Maumury-Gremaud, 1995). Mothers were given a questionnaire composed with a list of behaviors associated with their relationship with their child's teacher and were instructed to indicate the frequency of the behaviors based on their own experiences. The responses referred to a 5-point scale: NA = not applicable, 0 = never, 1 = once or twice a year, 2 = almost every month, 3 = almost every week, 4 = more than once per week. The original measure consisted of 26 items with 4 subscales: (1) quality of relationship between parent and teacher, (2) parent's involvement and volunteering at school, (3) parent's endorsement of child's school, and (4) frequency of parent-teacher contact. However, the TIER research team used a modified version for MHFE-2EC, which consisted of 17 items and excluding the subscale that covers the quality of relationship between parent and teacher. The modified version also included 9 items from the parent's involvement at school subscale, 4 items from the parent's endorsement subscale, and 4 items from the frequency of

parent-teacher contact subscale. In addition to these modifications, MHFE-2EC also included two modified versions of the original questions that were developed from the parent's involvement at school subscale.

The scoring method involved calculating a mean score for each subscale: (1) Parent's Involvement and Volunteering at School, (2) Parent's Endorsement of Child's School, (3) Frequency of Parent- Teacher Contact, and (4) Total mean score. Each subscale's scores ranged from 0 to 4 points. As shown in Table A3, my study utilized mean scores from the "Parent's Involvement and Volunteering at School" and "Frequency of Parent-Teacher-Contact" subscales at T5.

Missing Data. The following rules were followed for PTI during MHFE-2EC: (1) at least 7 of 9 items must be present and not NA for *Parent's Involvement and Volunteering at School*, (2) at least 3 of 4 items must be present for *Parent's Endorsement of Child's School*, (3) at least 3 of 4 items must be present for *Frequency of Parent-Teacher Contact*, and (4) all 3 subscales must be present in order to calculate the total score. While those rules were followed, the PTI has a high rate of missing potential data due to administration errors, such as NA being a frequent response, but for unclear reasons. There were also discrepancies about which childcare setting their child attended and the PTI was sometimes skipped when it should have been administered. On the other hand, the PTI was also sometimes administered when it should have been skipped during an instance where the child did not currently attend formal childcare.

Psychometric Properties. According to Miller-Johnson & Maumury-Gremaud (1995), four factors were successfully identified within the original PTI questionnaire, which helped develop the corresponding factor items into the four subscales. The PTI has been shown to

demonstrate good internal reliability and has been used within the Fast Track Project by exhibiting adequate test-retest stability in both normative and high risk samples (Corrigan, 2002).

In the MHFE-2EC study sample, Cronbach's alphas were presented in the following:

- Parent's Involvement and Volunteering at School: T5 = .68
- Frequency of Parent-Teacher Contact: T5 = .78

Home Literacy Environment Questionnaire (HLEQ): T5. The Home Literacy Environment Questionnaire was used to measure different aspects of the relevant home literacy environment by examining parent involvement and children's interest in literacy at T5. Parent involvement and children's interest in literacy were measured by having parents fill out a questionnaire that consisted of 10 items and they aimed to rate these items on a 7-point Likert scale. The rating scale points represented these values: 0 = Never, 1 = 1x/month, 2 = 2x/month, 3 = 1-2x/ week, 4 = 3-4x/ week, 5 = Almost daily, 6 = Daily. The original HLEQ consisted of 13 items and 3 subscales, but TIER only used a questionnaire consisting of 10 items with 2 subscales: Parent involvement and children's interest in literacy. Sum scores ranged from 0-60 points and the mean ranged from 0-6 points. Higher scores calculated from the final questionnaire results indicated higher parental involvement in literacy activities and children's literacy interests. As shown in Table A4, my study utilized mean scores from the "Parents' involvement in literacy-related activities" subscale at T5.

Psychometric Properties. The HLEQ demonstrated good reliability, validity, and test-retest stability and has been evaluated with both English and Spanish-speaking preschool children (Farver, Xu, Eppe, & Lonigan, 2006; Farver, Xu, Lonigan, & Eppe, 2012). The Cronbach's alphas relating to the two subscales from the MHFE-2EC are represented in the following: Parent's involvement in related activities: T5= 0.75.

Children's Academic Performance

Massachusetts Comprehensive Assessment System (MCAS): 3rd Grade. The MCAS intended to assess Massachusetts learning standards for students at a certain grade level. The English language arts and math sections of the MCAS were administered to students during their spring semester in third grade. All students who were enrolled in Massachusetts public schools and were currently at the appropriate grade level for testing were required to participate. After the students finished the test, they received a scaled score that ranged from 440 to 560 for each section of the test. As shown in Table 1, the scaled scores are categorized by achievement level, which can be interpreted by the following: a score of 440-469 is not meeting expectations, 470-499 is partially meeting the expectations, 500-529 is meeting expectations, and 530-560 is exceeding expectations (Massachusetts Department of Elementary and Secondary Education, 2017).

Children's School Attendance Records

Student Information Management System (SIMS): 3rd Grade. Data on children's school were documented each school year from kindergarten through third grades. There were three binary variables (*0 = No, 1 = Yes*) that related to school attendance and stability for each grade (see Table 1). Chronic absenteeism was documented and represented the instances of a student being absent for more than 10% of the school year. Truancy was also documented and connects to whether a student who has had more than 9 unexcused absences in one school year. School mobility represents whether a student transferred to different schools at least once within the academic year.

Control Variables

Child's Sex and Race/ Ethnicity. During my analyses, child's sex and mother's race/ethnicity acted as control variables.

Results

Preliminary Analyses

The continuous predictor variables measured self-regulation at T5 through the Head-Toes-Knees-Shoulders assessment (HTKS) and Emotion Regulation Checklist (ERC). The continuous moderator variables measured maternal school involvement at T5 through the Parent Teacher Involvement Questionnaire (PTI): Frequency of Parent-Teacher Contact and Parental Involvement and Volunteering at School and Home Literacy Environment Questionnaire (HLEQ): Parent's Involvement with Literacy at Home. The first set of continuous outcome variables measured academic performance through children's 3rd grade MCAS: ELA and Math Scaled Scores and the second categorical outcome variable measured Chronic Absenteeism in 3rd grade.

After conducting preliminary analyses for the continuous predictor and moderator variables, HTKS and HLEQ: Parent's Involvement with Literacy at Home appeared to be more negatively skewed, but did not have many outliers and had a large enough sample size (n = 158), which made them suitable for a correlation, moderation regression, logistic regression, and logistic regression with an interaction (see Table 1). The remaining predictor and moderator variables, ERC, PTI: Frequency of Parent-Teacher Contact, and PTI: Parent Involvement and Volunteering at School, were more positively skewed, also did not have many outliers, and had a large enough sample size (n = 158), which also made them suitable for the intended analyses (see Table 1).

Then, I conducted preliminary analyses for the continuous outcome variables, MCAS: ELA and Math Scaled Scores, and both variables were approximately normally distributed with not many outliers present. Subsequently, I examined the distributional properties of the categorical outcome variable by looking at the frequencies in each category for Chronic Absenteeism in 3rd Grade, which showed that 127 participants were not considered to be chronically absent (*0 = no*) and 31 participants were considered to be chronically absent (*1 = yes*). As shown in Table 1, this demonstrates that the outcome variables were suitable for the intended analyses because MCAS: ELA and Math Scaled scores were normally distributed and Chronic Absenteeism in 3rd grade had different amounts of participants in each group in order to make comparisons.

Data Analyses

Are Children's High Self-Regulation Skills Established in Early Childhood Associated with High Academic Performance in Elementary School?

HTKS and MCAS: ELA. The variables met the assumptions because neither of the HTKS and MCAS: ELA data sets presented any outliers and MCAS: ELA was normally distributed, which helped make these variables suitable for a correlation analysis. As shown in Table 2, the bivariate correlation between HTKS and MCAS: ELA was positive and moderate in size ($r = .396$; $p < .001$). This positive correlation demonstrates students' higher HTKS scores at T5 were associated with higher MCAS: ELA scaled scores in 3rd grade.

HTKS and MCAS: Math. The variables met the assumptions because neither of the HTKS and MCAS: Math data sets presented any outliers and MCAS: Math was normally distributed, which helped make these variables suitable for a correlation analysis. As shown in Table 2, the bivariate correlation between HTKS and MCAS: Math was also positive and

moderate in size (r = .375; p < .001). This positive correlation demonstrates that students' higher HTKS scores at T5 were associated with higher MCAS: Math scaled scores in 3rd grade.

ERC and MCAS: ELA. The variables met the assumptions because neither of the ERC and MCAS: ELA data sets presented any outliers and MCAS: ELA was normally distributed, which helped make these variables suitable for a correlation analysis. As shown in Table 2, the bivariate correlation between ERC and MCAS: ELA was negative and small in size (r = -.135; p = .022). This negative correlation demonstrates that higher ERC scores translate to higher levels of dysregulation being associated with lower MCAS: ELA scores in 3rd grade.

ERC and MCAS: Math. The variables met the assumptions because neither of the ERC and MCAS: Math data sets presented any outliers and MCAS: Math was normally distributed, which helped make these variables suitable for a correlation analysis. As shown in Table 2, the bivariate correlation between ERC and MCAS: Math was also negative and small in size (r = -.187; p = .01). This negative correlation demonstrates that higher ERC scores correspond to higher levels of dysregulation being associated with lower MCAS: Math scores in 3rd grade.

Are Children's High Self-Regulation Skills Established in Early Childhood Associated with Strong School Attendance Records in Elementary School?

After running a logistic regression analysis with HTKS and ERC predicting for Chronic Absenteeism in 3rd grade, it appeared that 82.7% of the sample was correctly predicted. One hundred eighty-two (100%) were correctly predicted to be not chronically absent in 3rd grade and 0 participants were correctly predicted to be chronically absent in 3rd grade.

HTKS and Chronic Absenteeism in 3rd grade. After conducting a logistic regression analysis with HTKS and Chronic Absenteeism in 3rd grade, the results showed that HTKS scores at T5 were not a significant predictor for Chronic Absenteeism in 3rd grade (Odds Ratio = .998;

p = .807). The odds ratio indicates that for every 1-point higher or 1-point lower on HTKS scores, the probability of the student having chronic absenteeism remains the same (see Table 3).

ERC and Chronic Absenteeism in 3rd grade. After conducting a logistic regression analysis with ERC and Chronic Absenteeism in 3rd grade, the results showed that ERC scores at T5 were not a significant predictor for Chronic Absenteeism in 3rd grade (Odds Ratio = 1.675; p = .194). The odds ratio indicates that for every 1-point higher or 1-point lower from ERC scores, the probability of the student having chronic absenteeism remains the same (see Table 3).

Does Maternal School Involvement Moderate the Association Between Self-Regulation Skills in Early Childhood and Academic Attendance and Performance in Elementary School?

HTKS x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and MCAS: ELA. A moderation regression analysis was conducted in order to examine the interaction between HTKS and PTI: Frequency of Parent-Teacher Contact (PTI: PC) on MCAS: ELA scores in 3rd grade. Model 1 showed that the 4.5% variation that child's sex and mother's race/ethnicity had on MCAS: ELA scores in 3rd grade is not significant and the individual predictors also were not significant predictors for MCAS: ELA scores in 3rd grade, $F(4,166) = 1.971$, $p = .101$, *R square* = .045. Model 2 showed that child's sex, mother's race/ethnicity, HTKS and PTI: PC scores had a significant 11.7% increase in variation on MCAS: ELA scores in 3rd grade, but only HTKS scores were significant predictors for MCAS: ELA scores in 3rd grade, $F(6, 164) = 5.295$, $p < .001$, *R square* = .162. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, PTI: PC, and the interaction between HTKS and PTI: PC had a significant and very small 0.1% increase in variation on MCAS: ELA scores in 3rd grade, but only HTKS scores were significant predictors for MCAS: ELA scores in 3rd grade, $F(7,163) = 4.520$, $p < .001$, *R square* = .163 (see Table 4). This explains how HTKS scores at T5 were significant predictors for MCAS: ELA scores in 3rd

grade, but examining child's sex, mother's race/ethnicity, PTI: PC scores, and incorporating PTI: PC as a moderator did not create a significant change in the association between HTKS scores at T5 and MCAS: ELA scores in 3rd grade.

HTKS x PTI: Parent Involvement and Volunteering (PTI: PI) and MCAS: ELA. Another moderation regression analysis was conducted in order to examine the interaction between HTKS and PTI: Parent Involvement and Volunteering (PTI: PI) on MCAS: ELA scores in 3rd grade. Model 1 showed that the 4.1% variation that child's sex and mother's race/ethnicity had a on MCAS: ELA scores in 3rd grade was not significant, and the predictors were also not significant predictors for MCAS: ELA scores in 3rd grade, $F(4,161) = 1.708$, $p = .151$, *R square* = .041 . Model 2 showed that child's sex, mother's race/ethnicity, HTKS and PTI: PI scores had a significant 10.7% increase in variation on MCAS: ELA scores in 3rd grade, but only HTKS scores significantly predicted MCAS: ELA scores in 3rd grade, $F(6, 159) = 4.606$, $p < .001$, *R square* = .148. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, PTI: PI, and the interaction between HTKS and PTI: PI had a significant and very small 0.2% increase in variation on MCAS: ELA scores in 3rd grade, but the individual predictors and interactions did not significantly predict MCAS: ELA scores in 3rd grade, $F(7, 158) = 3.974$, $p < .001$, *R square* = .150 (see Table 5). This explains that child sex's, mother's race/ethnicity, HTKS scores at T5, PTI: PI scores, and incorporating PTI: PI as a moderator did not act as significant predictors on MCAS: ELA scores in 3rd grade.

HTKS x HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) and MCAS: ELA. An additional moderation regression analysis was conducted in order to examine the interaction between HTKS and HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) on MCAS: ELA scores in 3rd Grade. Model 1 showed that child's sex and

mother's race/ethnicity had a significant 5.9% variation on MCAS: ELA scores in 3rd grade, but only race/ethnicity significantly predicted for MCAS: ELA scores in 3rd grade, $F(4,179) = 2.828$, $p = .026$, *R square* = .059. Model 2 showed that child's sex, mother's race/ethnicity, HTKS and HLEQ: PI scores had a significant 11.8% increase in variation on MCAS: ELA scores in 3rd grade, but only HTKS scores significantly predicted for MCAS: ELA scores in 3rd grade, $F(6, 177) = 6.327$, $p < .001$, *R square* = .177. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, HLEQ: PI, and the interaction between HTKS and HLEQ: PI had a significant and very small 0.3% increase in variation on MCAS: ELA scores in 3rd grade, but the predictors and interactions were not significant predictors for MCAS: ELA scores in 3rd grade, $F(7,176) = 5.522$, $p < .001$, *R square* = .180 (see Table 6). This explains that child's sex, mother's race/ethnicity, HTKS scores at T5, HLEQ: PI, and incorporating HLEQ: PI as a moderator did not act as significant predictors on MCAS: ELA scores in 3rd grade.

HTKS x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and MCAS: Math. A moderation regression analysis was conducted in order to examine the interaction between HTKS and PTI: Frequency of Parent-Teacher Contact (PTI: PC) on MCAS: Math scores in 3rd grade. Model 1 showed that the 4.3% variation that child's sex and mother's race/ethnicity had on MCAS: ELA scores in 3rd grade is not significant and the individual predictors also were not significant predictors for MCAS: Math scores in 3rd grade, $F(4,165) = 1.832$, $p = .125$, *R square* = .043. Model 2 showed that child's sex, mother's race/ethnicity, HTKS and PTI: PC scores had a significant 11.9% increase in variation on MCAS: Math scores in 3rd grade, but only HTKS scores were significant predictors for MCAS: Math scores in 3rd grade, $F(6, 163) = 5.251$, $p < .001$, *R square* = .162. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, PTI: PC, and the interaction between HTKS and PTI: PC had a significant and very small 0.1% increase in

variation on MCAS: ELA scores in 3rd grade, but only HTKS scores were significant predictors for MCAS: ELA scores in 3rd grade, $F(7,162) = 4.507$, $p < .001$, *R square* = .163 (see Table 7). This explains how HTKS scores at T5 were significant predictors for MCAS: Math scores in 3rd grade, but examining child's sex and mother's race/ethnicity, PTI: PC scores, and incorporating PTI: PC as a moderator did not create a significant change in the relation between HTKS scores at T5 and MCAS: Math scores in 3rd grade.

HTKS x PTI: Parent Involvement and Volunteering (PTI: PI) and MCAS: Math.

Another moderation regression analysis was conducted in order to examine the interaction between HTKS and PTI: Parent Involvement and Volunteering (PTI: PI) on MCAS: Math scores in 3rd grade. Model 1 showed that the 4.1% variation that child sex and mother race/ethnicity had on MCAS: Math scores in 3rd grade was not significant, and the predictors were also not significant predictors for MCAS: Math scores in 3rd grade, $F(4,161) = 1.708$, $p = .151$, *R square* = .041. Model 2 showed that child sex, mother race/ethnicity, HTKS and PTI: PI scores had a significant 10.2% increase in variation on MCAS: Math scores in 3rd grade, but only HTKS scores significantly predicted MCAS: Math scores in 3rd grade, $F(6, 158) = 4.398$, $p < .001$, *R square* = .143. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, PTI: PI, and the interaction between HTKS and PTI: PI had a significant and very small 0.1% increase in variation on MCAS: Math scores in 3rd grade, but the individual predictors and interactions did not significantly predict MCAS: Math scores in 3rd grade, $F(7, 157) = 3.781$, $p = .001$, *R square* = .144 (see Table 8). This explains that child's sex, mother's race/ethnicity, HTKS scores at T5, PTI: PI scores, and incorporating PTI: PI as a moderator did not act as significant predictors on MCAS: Math scores in 3rd grade.

HTKS x HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) and MCAS: Math. An additional moderation regression analysis was conducted in order to examine the interaction between HTKS and HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) on MCAS: Math scores in 3rd grade. Model 1 showed that the 4.7% variation that child's sex and mother's race/ethnicity had on MCAS: Math scores in 3rd grade was not significant, and the predictors did not significantly predict MCAS: Math scores in 3rd grade, $F(4,178) = 2.201$, $p = .071$, *R square* = .047. Model 2 showed that child's sex, mother's race/ethnicity, HTKS and HLEQ: PI scores had a significant 11.5% increase in variation on MCAS: Math scores in 3rd grade, but only HTKS scores significantly predicted for MCAS: Math scores in 3rd grade, $F(6, 167) = 5.671$, $p < .001$, *R square* = .162. Model 3 showed that child's sex, mother's race/ethnicity, HTKS, HLEQ: PI, and the interaction between HTKS and HLEQ: PI had a significant 16.2% variation on MCAS: Math scores in 3rd grade, which is the same amount of variation in Model 2; however, the predictors and interactions were not significant predictors for MCAS: Math scores in 3rd grade, $F(7,175) = 4.846$, $p < .001$, *R square* = .162 (see Table 9). This explains that child's sex, mother's race/ethnicity, HTKS scores at T5, HLEQ: PI, and incorporating HLEQ: PI as a moderator did not act as significant predictors on MCAS: Math scores in 3rd grade.

ERC x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and MCAS: ELA. Another moderation regression analysis was conducted in order to examine the interaction between ERC and PTI: Frequency of Parent-Teacher Contact (PTI: PC) on MCAS: ELA scores in 3rd grade. Model 1 showed that child's sex and mother's race/ethnicity had a significant 4.5% variation on MCAS: ELA scores in 3rd grade, but only child's sex individually significantly predicted for MCAS: ELA scores in 3rd grade, $F(4,248) = 2.939$, $p = .021$, *R square* = .045.

Model 2 showed that child's sex, mother's race/ethnicity, ERC and PTI: PC scores had a significant 1.2% increase in variation on MCAS: ELA scores in 3rd grade, but the individual predictors did not significantly predict for MCAS: ELA scores in 3rd grade, $F(6, 246) = 2.491$, $p = .023$, *R square* = .057. Model 3 showed that child's sex, mother's race/ethnicity, ERC, PTI: PC, and the interaction between ERC and PTI: PC had a significant and very small 0.3% increase in variation on MCAS: ELA scores in 3rd grade, but the individual predictors and interactions did not significantly predict for MCAS: ELA scores in 3rd grade, $F(7,245) = 2.238$, $p = .032$, *R square* = .060 (see Table 10). This explains that child's sex, mother's race/ethnicity, ERC scores, PTI: PC scores, and incorporating PTI: PC as a moderator did not act as significant predictors on MCAS: ELA scores in 3rd grade.

ERC x PTI: Parent Involvement and Volunteering (PTI: PI) and MCAS: ELA.

Another moderation regression analysis was conducted in order to examine the interaction between ERC and PTI: Parent Involvement and Volunteering (PTI: PI) on MCAS: ELA scores in 3rd grade. Model 1 showed that child's sex and mother's race/ethnicity had a significant 4.1% variation on MCAS: ELA scores in 3rd grade, but only child's sex was a significant predictor for MCAS: ELA scores in 3rd grade, $F(4, 242) = 2.577$, $p = .038$, *R square* = .041. Model 2 showed that child sex, mother race/ethnicity, ERC and PTI: PI scores had a significant 2% increase in variation on MCAS: ELA scores in 3rd grade, but none of the individual predictors significantly predicted MCAS: ELA scores in 3rd grade, $F(6, 240) = 2.592$, $p = .019$, *R square* = .061. Model 3 showed that child's sex, mother's race/ethnicity, ERC, PTI: PI, and the interaction between ERC and PTI: PI had a significant and very small 0.1% increase in variation on MCAS: ELA scores in 3rd grade, but the individual predictors and interactions did not significantly predict MCAS: ELA scores in 3rd grade, $F(7, 239) = 2.237$, $p = .037$, *R square* = .062 (see Table 11). This explains

that child's sex, mother's race/ethnicity, ERC scores, PTI: PI scores, and incorporating PTI: PI as a moderator did not act as significant predictors on MCAS: ELA scores in 3rd grade.

ERC x HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) and MCAS: ELA. An additional moderation regression analysis was conducted in order to examine the interaction between ERC and HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) on MCAS: ELA scores in 3rd grade. Model 1 showed that child's sex and mother's race/ethnicity had a significant 5% variation on MCAS: ELA scores in 3rd grade and these two predictors also significantly predicted for MCAS: ELA scores in 3rd grade, $F(4, 268) = 3.526$, $p = .008$, *R square* = .050. Model 2 showed that child sex, mother race/ethnicity, ERC and HLEQ: PI scores had a significant 1.5% increase in variation on MCAS: ELA scores in 3rd grade, but only child's sex and mother's race/ ethnicity significantly predicted for MCAS: ELA scores in 3rd grade, $F(6, 266) = 3.082$, $p = .006$, *R square* = .065. Model 3 showed that child's sex, mother's race/ethnicity, ERC, HLEQ: PI, and the interaction between ERC and HLEQ: PI had a significant and very small 0.3% increase in variation on MCAS: ELA scores in 3rd grade, but only child's sex and mother's race/ ethnicity were significant predictors for MCAS: ELA scores in 3rd grade, $F(7,265) = 2.778$, $p = .008$, *R square* = .068 (see Table 12). This explains how child's sex and mother's race/ethnicity were significant predictors for MCAS: ELA scores in 3rd grade, but examining ERC scores, HLEQ: PI scores, and incorporating HLEQ: PI as a moderator did not create a significant change in the association between ERC scores at T5 and MCAS: ELA scores in 3rd grade.

ERC x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and MCAS: Math. Another moderation regression analysis was conducted in order to examine the interaction between ERC and PTI: Frequency of Parent-Teacher Contact (PTI: PC) on MCAS: Math scores

in 3rd grade. Model 1 showed that the 3.1% variance that child's sex and mother's race/ethnicity had on MCAS: Math scores in 3rd grade and individual predictors were not significant in predicting for MCAS: Math scores in 3rd grade, $F(4, 247) = 1.986$, $p = .097$, *R square* = .031. Model 2 showed that child's sex, mother's race/ethnicity, ERC and PTI: PC scores had a significant 3.1% increase in variation on MCAS: Math scores in 3rd grade, but only ERC scores significantly predicted for MCAS: Math Scores in 3rd grade, $F(6, 245) = 2.685$, $p = .015$, *R square* = .062. Model 3 showed that child's sex, mother's race/ethnicity, ERC, PTI: PC, and the interaction between ERC and PTI: PC had a significant and very small 0.2% increase in variation on MCAS: Math scores in 3rd grade, but the individual predictors and interactions were not significant predictors for MCAS: Math scores in 3rd grade, $F(7,245) = 2.238$, $p = .032$, *R square* = .064 (see Table 13). This explains that child's sex, mother's race/ethnicity, ERC scores, PTI: PC scores, and incorporating PTI: PC as a moderator did not act as significant predictors on MCAS: Math scores in 3rd grade.

ERC x PTI: Parent Involvement and Volunteering (PTI: PI) and MCAS: Math.

Another moderation regression analysis was conducted in order to examine the interaction between ERC and PTI: Parent Involvement and Volunteering (PTI: PI) on MCAS: Math scores in 3rd grade. Model 1 showed that the 2.7% variation that child's sex and mother's race/ethnicity had on MCAS: Math scores in 3rd grade and individual predictors were not significant in predicting for MCAS: Math scores in 3rd grade, $F(4, 241) = 1.689$, $p = .153$, *R square* = .027. Model 2 showed that child's sex, mother's race/ethnicity, ERC and PTI: PI scores had a significant 3.6% increase in variation on MCAS: Math scores in 3rd grade, but only ERC scores were significant predictors on MCAS: Math scores, $F(6, 239) = 2.671$, $p = .016$, R square = .063. Model 3 showed that child's sex, mother's race/ethnicity, ERC, HLEQ: PI, and the interaction

between ERC and PTI: PI had a significant 6.3% variation on MCAS: Math scores in 3rd grade, which was the same amount of variation in Model 2; however, none of the predictors and interactions were significant in predicting MCAS: Math scores in 3rd grade, $F(7,238) = 2.293$, $p = .028$, *R square* = .063 (see Table 14). This explains that child's sex, mother's race/ethnicity, ERC scores, PTI: PI scores, and incorporating PTI: PI as a moderator did not act as significant predictors on MCAS: Math scores in 3rd grade.

ERC x HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) and MCAS: Math. An additional moderation regression analysis was conducted in order to examine the interaction between ERC and HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) on MCAS: Math scores in 3rd grade. Model 1 showed that the 3% variation that child's sex and mother's race/ethnicity had on MCAS: Math scores in 3rd grade was not significant and the individual predictors also did not significantly predict for MCAS: Math scores in 3rd grade, $F(4, 267) = 2.047$, $p = .088$, *R square* = .030. Model 2 showed that child's sex, mother's race/ethnicity, ERC and HLEQ: PI scores had a significant 4.9% increase in variation on MCAS: Math scores in 3rd grade, but only ERC and HLEQ: PI scores significantly predicted for MCAS: Math scores in 3rd grade, $F(6, 265) = 3.803$, $p = .001$, *R square* = .079. Model 3 showed that child's sex, mother's race/ethnicity, ERC, HLEQ: PI, and the interaction between ERC and HLEQ: PI had a significant 7.9% in variation on MCAS: Math scores in 3rd grade, which is the same amount of variation in Model 2; however, the predictors and interactions were not significant predictors for MCAS: Math scores in 3rd grade, $F(7,264) = 3.254$, $p = .002$, *R square* = .079 (see Table 15). This explains that child's sex, mother's race/ethnicity, ERC scores, HLEQ: PI scores, and incorporating HLEQ: PI as a moderator did not act as significant predictors on MCAS: Math scores in 3rd grade.

Does Maternal School Involvement Moderate the Association Between Self-Regulation Skills in Early Childhood and Academic Performance and School Attendance in Elementary School?

HTKS x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and Chronic Absenteeism in 3rd Grade. After running a logistic regression analysis with an interaction with HTKS as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and a HTKS and PTI: PC interaction, it appeared that 82.7%of the sample was correctly predicted. Based on the results of the logistic regression with an interaction, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, HTKS, and PTI: PC, Model 3: child's sex, mother's race/ethnicity, HTKS, PTI: PC, and the interaction between HTKS and PTI: PC), were not significant in predicting chronic absenteeism in 3rd grade (see Table 16). The odds ratio indicates that regardless of controlling for child's sex and mother's race/ethnicity, for every 1-point higher or 1-point lower on HTKS and PTI: PC, the probability of the student having chronic absenteeism remains the same.

HTKS x PTI: Parent Involvement and Volunteering (PTI: PI) and Chronic Absenteeism in 3rd grade. With HTKS as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and a HTKS and PTI: PI interaction, it appeared that 83.3% of the sample was correctly predicted. Similar to the previous analysis, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, HTKS, and PTI: PI, Model 3: child's sex, mother's race/ethnicity, HTKS, PTI: PI, and the interaction between HTKS and PTI: PI), were not significant in predicting chronic absenteeism in 3rd grade (see Table 17). The odds ratio indicates

that regardless of controlling for child sex and mother race/ethnicity, for every 1-point higher or 1-point lower on HTKS and PTI: PI, the probability of the student having chronic absenteeism remains the same.

HTKS X HLEQ: Parents Involvement in Literacy Related Activities (HLEQ: PI) and Chronic Absenteeism in 3rd Grade. Implementing HTKS as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and a HTKS and HLEQ: PI interaction, it appeared that 82.9% of the sample was correctly predicted. When HLEQ: PI was incorporated into the interaction with HTKS, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, HTKS, and HLEQ: PI, Model 3: child's sex, mother's race/ethnicity, HTKS, HLEQ: PI, and the interaction between HTKS and HLEQ: PI), were not significant in predicting chronic absenteeism in 3rd grade (see Table 18). The odds ratio indicates that regardless of controlling for child's sex and mother's race/ethnicity, for every 1-point higher or 1-point lower on HTKS and HLEQ: PI, the probability of the student having chronic absenteeism remains the same.

ERC x PTI: Frequency of Parent-Teacher Contact (PTI: PC) and Chronic Absenteeism in 3rd Grade. After running another logistic regression analysis with an interaction with ERC as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and an ERC and PTI: PC interaction, it appeared that 82.7% of the sample was correctly predicted. Based on the results from the logistic regression with an interaction, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, ERC, and PTI: PC, Model 3: child's sex, mother's race/ethnicity, ERC, PTI: PC, and the interaction between ERC and PTI: PC), were

not significant in predicting chronic absenteeism in 3rd grade (see Table 19). The odds ratio indicates that regardless of controlling for child's sex and mother's race/ethnicity, for every 1-point higher or 1-point lower on ERC and PTI: PC, the probability of the student having chronic absenteeism remains the same.

ERC x PTI: Parent Involvement and Volunteering (PTI: PI) and Chronic Absenteeism in 3rd grade. Inputting ERC as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and an ERC and PTI: PI interaction, it appeared that 82.7% of the sample was correctly predicted. Similar to the previous analysis, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, ERC, and PTI: PI, Model 3: child's sex, mother's race/ethnicity, ERC, PTI: PI, and the interaction between ERC and PTI: PI), were not significant in predicting chronic absenteeism in 3rd grade (see Table 20). The odds ratio indicates that regardless of controlling for child's sex and mother's race/ethnicity, for every 1-point higher or 1-point lower on ERC and PTI: PI, the probability of the student having chronic absenteeism remains the same.

ERC X HLEQ: Parents Involvement in Literacy Related Activities and Chronic Absenteeism in 3rd Grade. With ERC as a predictor variable, child's sex and mother's race/ethnicity as control variables, chronic absenteeism in 3rd grade as the outcome variable, and an ERC and HLEQ: PI interaction, it appeared that 82.2% of the sample was correctly predicted. When HLEQ: PI was incorporated into the interaction with ERC, all three models (Model 1: child's sex, mother's race/ethnicity, Model 2: child's sex, mother's race/ethnicity, ERC, and HLEQ: PI, Model 3: child's sex, mother's race/ethnicity, ERC, HLEQ: PI, and the interaction between ERC and HLEQ: PI), were not significant in predicting chronic absenteeism in 3rd grade

(see Table 21). The odds ratio indicates that regardless of controlling for child's sex and mother's race/ethnicity, for every 1-point higher or 1-point lower on ERC and HLEQ: PI, the probability of the student having chronic absenteeism remains the same.

Discussion

The objectives of this study were to examine if children's self-regulation skills (executive functioning and emotion regulation) established in early childhood are associated with academic performance and school attendance records in elementary school and if maternal school involvement creates any significant change between those associations. The main findings support the idea that executive functioning skills established in early childhood are associated with academic performance in elementary school and that the relation between emotion regulation in early childhood and academic performance differed due to children's sex and mother's race/ethnicity.

Executive functioning and emotion regulation established in early childhood were significant predictors of academic performance in elementary school, but executive functioning had a stronger association than emotion regulation did with academic performance. There were no significant findings relating to maternal involvement creating a change in the association between both forms of early self-regulation and academic performance in elementary school; both aspects of early self-regulation were also not significant predictors of school attendance records in elementary school.

Executive functioning in early childhood was a significant predictor of academic performance in elementary school. According to this study's data that documented academic performance through MCAS: scores in 3rd grade, 39% of the 3rd grade students in this study met expectations based on MCAS: ELA scores and 43% of all 3rd grade students in Massachusetts

public schools met expectations based on MCAS: ELA scores (Massachusetts Department of Elementary and Secondary Education, 2020). When evaluating the MCAS: Math scores, 32% of the 3rd grade students in this study met expectations and 40% of all 3rd grade students in Massachusetts public schools met expectations based on MCAS: Math scores (Massachusetts Department of Elementary and Secondary Education, 2020). In comparison to this normative data, the children in this study received MCAS: ELA and Math scores that were closely aligned with the MCAS: ELA and Math scores for all 3rd graders in Massachusetts public schools. These results support the original hypothesis and are consistent with previous literature showing that self-regulation is an important skill that can help support and strengthen children's school readiness, which can lead to academic and personal success in the future (Geeraerts et al., 2019; Domitrovich et al., 2017). These results support the idea that it is necessary for children to exhibit executive functioning skills in order to control their impulses during class, sit down, and listen to the teacher's instructions while simultaneously comprehending those instructions and possibly writing information in their notebook that pertains to the current lesson (Jones et al., 2015).

Although the association was not as strong, emotion regulation was still significantly associated with academic performance, which explains that higher levels of dysregulation was related to lower academic performance. This finding supports the idea that being able to regulate their emotions during times of distress was related to being able to exhibit their proficiencies in academic material. Therefore, when children are able to exhibit strong emotion regulation skills, it is possible that these skills help them to become more actively engaged and present when encountering new challenges and learning new academic material in class.

Executive functioning and emotion regulation in early childhood were not related to school attendance records in elementary school. Even when considering how involved mothers were in their children's school, their school involvement also did not make a difference in their children's school attendance records in elementary school. My original hypothesis predicted that children who have high self-regulation skills in early childhood would have strong school attendance records in elementary school, which assumes that children with poor self-regulation skills in early childhood might have poor school attendance records in elementary school due to possibly getting expelled or suspended for exhibiting challenging behavior at school (Miller et al., 2017). Since these results did not align with my hypotheses, it is possible that even if children do exhibit challenging behavior at school due to poor self-regulation skills, it might not cause them to become expelled or suspended because teachers and staff strive to help these students improve in their self-regulation skills while they are at school. Another possibility is that children might have chronic absenteeism due to other factors, such as health issues, lack of transportation, or families being away for long periods of times due to vacation or other personal factors. A lot of these possible reasonings for being chronically absent are also more related to the parents' responsibilities and actions associated with bringing their child to school frequently; during the early elementary years, children alone do not have a lot of control over how or when they are able to attend school. Therefore, executive functioning and emotion regulation difficulties might not be a reason why some children have chronic absenteeism in 3rd grade; there are other health and family related factors to consider.

Both executive functioning and emotion regulation skills in early childhood were related to children's academic performance in elementary school, but mothers' involvement in their children's school did not make a difference in children's academic performance in elementary

school. A potential reason for why maternal involvement was not associated with a change in the relation between children's executive functioning skills and academic performance in elementary school is because children's executive functioning skills could have improved during this time span of about two to three years. As mentioned previously when explaining why the associations between executive functioning and chronic absenteeism were not significant, it is possible that teachers were able to work with children throughout these years to help the children learn and practice executive functioning techniques that are embedded in their everyday classroom routines. Teachers might enforce certain routines or expectations in the classroom to help children develop an understanding on what is expected of them in the classroom, such as raising their hand when they have a question or want to speak or listening to and following directions when the teacher is leading an art project that might require multiple steps. With repetition through daily classroom routines and expectations and simply observing other children's behavior in their class, this can help support and strengthen children's executive functioning skills. When children develop a strong foundation in executive functioning, this could help them control their impulses and pay attention when appropriate and be prepared to comprehend and apply their knowledge through academic performance.

There were significant associations between emotion regulation and academic performance in ELA competencies for boys, but not for girls. Since there were significant differences when evaluating emotion regulation skills being associated with ELA competencies between boys and girls, these differences can be accounted for based on gender role assumptions that are relevant in particular contexts. For example, girls are more likely to be characterized as empathetic, emotionally expressive, and have better conduct in school compared to boys, and those characteristics are related to executive functioning and emotion regulation abilities, which

are associated with high academic performance (Gillen & Hall, 2010; Millard & Bhojwani, 2010; Sheng, 2012). These gender assumptions could also create a certain bias towards the types of activities that parents and teachers initiate with certain genders. Since girls tend to be more emotionally expressive and might be geared towards more reserved activities, such as drawing and reading, this might influence parents and teachers to initiate more solitary, literacy activities, such as reading and writing, with a girl compared to a boy who might be more interested and compliant in more gross motor-based activities, such as running and playing outside (Gillen & Hall, 2010; Millard & Bhojwani, 2010; Sheng 2012). If parents and teachers are initiating girls to participate in more literacy activities than they are with boys, then this could provide girls more opportunities to practice their literacy skills and can help prepare them to exhibit higher academic performance in ELA in elementary school in comparison to boys.

Similarly, there were significant associations between children's emotion regulation and academic performance in ELA competencies for children with mothers who identified their race/ethnicity as "Other", but not for children with mothers who did not identify their race/ethnicity as "Other", which was classified as "non-Hispanic Other". Due to some limitations, it is unclear how to explain the specific differences related to mothers' race/ethnicity because there is limited information on which specific races/ethnicities are applicable to being non-Hispanic Other. However, some general explanations can be made by comparing how cultural values might differ in relation to emotion regulation and literacy development. Based on families' cultural values and practices, enriching literacy environments might have an important role in their household and everyday routines. For example, one culture might emphasize the importance of parents and other adults in the household reading to the children and directly and indirectly teaching literacy concepts during their everyday lives (Baroody & Diamond, 2010;

Puglisi et al., 2017; Senechal & LaFevre, 2014). On the other hand, another culture might believe that literacy development and overall academic growth strictly happens at school with the teacher exhibiting the role of an academic educator and the parents maintaining the role of nurturers by keeping their child mentally and physically safe and healthy (Huntsinger & Jose, 2009; Sheng, 2012). Along with also believing that teachers and parents have completely separate roles in impacting the child's development, parents might also strongly believe that it is not their responsibility to be involved at all with their child's school-work because they believe that teachers should be fully trusted and credible in relation to their children's academic progress and achievements. With this clear separation between home and school, any type of intersection between these two contexts would involve disrespectful acts of overstepping in one's primary role (Huntsinger & Jose 2009; Sheng, 2012).

This study was initially framed within Bronfenbrenner's ecological systems theory in order to examine interactions that occur in the microsystem and mesosystem. According to the results of this study, interactions within the mesosystem, which involved maternal school involvement, did not create significant differences in self-regulation and academic performance and school attendance. However, when evaluating interactions in the microsystem, which included data relating to direct interactions between the child and another individual or context (researcher, mother, and school), these interactions created significant associations. Therefore, the findings of this study somewhat align with the ecological systems theory in regards to interactions in the microsystem influencing the children's self-regulation and academic performance, but these results did not document interactions between indicators of mesosystem and microsystem.

Limitations

This study had both strengths and limitations. Some strengths include that this longitudinal study measured children's self-regulation abilities a couple of years before evaluating academic performance and school attendance data; this allowed the research to examine if the self-regulation skills established in early childhood predict academic performance and school attendance records by the time they are in elementary school. This study also utilized data that were collected in different contexts, which were based on a researcher's perspective (HTKS), mother's perspective (ERC, PTI: PC, PTI: PI, HLEQ: PI), and the school setting (MCAS: ELA and Math scores, and Chronic School Absenteeism in 3rd grade). More specifically, each self-regulation measure also assessed different subcomponents of self-regulation with HTKS measuring executive functioning and ERC measuring emotion regulation/ dysregulation since both subcomponents are associated with different skillsets. Similarly, the maternal involvement questionnaires measured maternal involvement through different contexts: direct school involvement through parent-teacher conversations (PTI: PC) and volunteering at school (PTI: PI) and indirect school involvement by incorporating literacy enriching environments in the home setting (HLEQ: PI).

Some of the study's measures had limitations when examining the specific constructs related to the particular measure. After evaluating and reflecting the results from this study, a limitation on the HTKS assessment involved measuring executive functioning in a command-based format compared to measuring these skills in a more natural setting. The ERC questionnaire was also limited because children's levels of dysregulation were only assessed through the mother's perspective and not through an additional perspective in a different context, such as a teacher's perspective. The PTI: PC questionnaire was also limited because the questionnaire items did not specify whether or not the frequent parent-teacher contact instances

were negative or positive interactions, such as discussing a problem regarding the child or sharing academic or social-emotional growth updates regarding the child.

In relation to having relatively low average scores on the PTI and HLEQ subscales, which relate to lower levels of maternal involvement, this also acts as a limitation because this study did not consider mothers' educational and career status when evaluating maternal school involvement. Considering mothers' educational and career obligations could have possibly led to further explanation towards fewer instances of maternal involvement. Lastly, it is unclear if MCAS scores are valid measures in measuring young children's academic performance in ELA and Math due to limited literature discussing any possible associations between MCAS scores and data collected from classroom contexts, such as grades, reading levels, classroom observations, or teacher ratings.

Measuring Executive Functioning in a Command-Based Format

Measuring executive functioning skills through HTKS, a more command-based format, has some limitations based on environment and delivery of this assessment. Based on the results from the correlation analysis, it appears that scores from HTKS at T5 were significantly associated with MCAS: ELA and Math scores by the time the children were in 3rd grade, but the correlation was not very strong. Since the correlation was not very strong, it is possible that executive functioning skills were measured through a limited format and perspective.

The HTKS assessment measured executive functioning in a more direct, command-based format, so some children might not exhibit their best executive functioning skills in this type of environment due to feeling nervous or uncomfortable. Since the outcome variables (MCAS: ELA and Math scores in 3rd grade) are measuring academic performance in a school setting, but the predictor variable, executive functioning, is not measured in a school setting, this also can

raise questions about the validity of this measurement because the child's abilities exhibited through a command-based format with a stranger might differ compared to their abilities in a classroom with their peers and teachers who they are familiar with. Some children might also exhibit stronger executive functioning skills in a more natural setting, such as being able to sit down quietly and listen and pay attention to the teacher when they are reading a story, compared to being commanded on the spot to act upon executive functioning skills.

Measuring Emotion Regulation Through the Mother's Perspective

In relation to the format and environment in which executive functioning was measured, the ERC questionnaire that measured emotion regulation also had limitations based on the perspective or context in which children's emotion regulation skills were evaluated. Similarly, ERC mean scores demonstrated a significant, but not very strong association with MCAS: ELA and Math scores, which translated into higher levels of dysregulation being associated with lower academic performance. Measuring emotion regulation abilities through the ERC questionnaire had limitations because children's emotion regulation abilities were evaluated through the mother's perspective based on her knowledge on how her child expresses emotions in the home setting or within contexts where the mother is present with her child, such as family events, trips to the grocery store, play dates at the park, etc. Since these behaviors are rated based on this perspective and these environments, these behaviors might only be relevant in these settings with those people involved. Therefore, children's emotion regulation abilities might differ when they are in the school setting with teachers and peers. There can also be instances where a parent might perceive the child to have poor emotion regulation abilities based on those scenarios in the home or family setting and a teacher might perceive the child to have strong emotion regulation abilities based on those scenarios in the school setting. It is also possible that since it is a big part

of teachers' professions to learn how to support and work with children with challenging behaviors, they might have higher tolerances and patience for challenging behavior instances and might be more educated and aware of what is developmentally appropriate or not.

Do Parent-Teacher Contact Instances Entail Negative or Positive Interactions?

There are some limitations regarding the PTI: Frequency of Parent-Teacher Contact subscale because there is not a lot of detail that includes the context in which parents are rating their experiences. For example, there are no specific details that explain if the frequent parent-teacher phone calls are due to discussing how the child is being challenging at home or in the classroom or if teachers are calling them to share the positive aspects in which the child seems to be thriving. For example, if the parent rates the majority of the items with a 4, which indicates that the parent-teacher contact methods are occurring more than once per week, it assumes that there is a high frequency in parent-teacher contact, but it does not distinguish what is discussed in these conversations.

Even though there was no significance found with maternal involvement attempting to change the association between early self-regulation skills and academic performance and school attendance, it would still be beneficial to gain information on what entailed in these frequent parent-teacher interactions during the school year to get a better sense of why these conversations were initiated. For instance, if the frequent parent-teacher conversations focused on discussing challenges about the child or even disagreements between the two parties, this might not have moderated the association between self-regulation and academic achievement or school attendance.

Considering Mothers' Educational or Career Statuses During Time of Data Collection

While maternal school and literacy involvement did not create significant changes in the associations between children's self-regulation in early childhood and academic performance and school attendance in elementary school, it is possible that there were other maternal-related factors that influenced children's self-regulation, academic performance, and school attendance. A possible factor that was not evaluated in this study were mothers' education and employment statuses. Especially if mothers were currently in school when the children were approximately six years old, it is possible that they were too busy with their own school and work schedules to actively participate in more school related functions. Although previous literature has discussed that when parents are actively involved in their children's school, it can influence children's motivation towards school, it is possible that maybe other events or interactions that occur with the mother and child also have an influence in a child's interest towards school (DuBransky, 2014; Huntsinger & Jose, 2009; Pare, 2009).

If the child's mother was currently in school and was actively telling her child about her school-work (sharing that she also does different projects and eats lunch with her friends at school), this can create a common ground between the mother and child (DuBransky, 2014). Since children often admire many adult tasks that they observe their parents do and often attempt to emulate these tasks by pretending to read a book, pretending to pack their toy briefcase to get ready for work, etc., seeing their mother get ready for school and talk about her experiences might create some kind of influence in making children also feel excited about school (DuBransky, 2014; Newland, 2015; Pare, 2009).

Are Massachusetts Comprehensive Assessment Systems Exams (MCAS) Valid Measures?

One might question the validity of MCAS exams accurately measuring children's academic performance. There were no previous studies discussing the associations between

elementary students' MCAS scores and data derived from classroom contexts, such as grades, observations, reading levels, or teacher ratings. However, according to very limited literature sources, MCAS exam scores have been established as significant predictors of students' college readiness when evaluating high school and freshmen college students. For example, when students were in high school and received scores that were in the range of the "Meeting Expectations" category, then they were predicted to not be required to enroll in remedial courses and were more likely to receive passing grades in their coursework, such as B's and C's, during their freshmen year of college (Nichols-Barrer et al., 2016).

Although this previous literature investigated academic influences through students older than the students in this study's sample, these findings can support the idea that students' MCAS exam scores can predict how ready they are for college level coursework and how well they will succeed in those courses. This supports the idea that the topics that high school students are tested on through the MCAS exams could be effectively measuring their specific knowledge and understanding in those particular subjects instead of just measuring their standardized test taking abilities (Harrington, 2009; Nichols-Barrer et al., 2016). Therefore, there are still limitations in this area when evaluating if elementary students' MCAS scores are also significant predictors of being proficient in more advanced tasks in the future, such as demonstrating proficiencies related to middle school or high school readiness or if there are any associations between their elementary MCAS scores and report card grades.

Implications

These findings support the idea that children's executive functioning skills can influence their academic success and lead them on their way to academic and personal success. These findings could encourage policy makers, teachers, and school administrators to incorporate more

executive functioning related activities and content into school curricula. Policy makers can develop standards into early childhood education regulations that involve requiring teachers to have more formal training in how to implement executive functioning exercises and activities into their curriculum. These training prerequisites can be in the form of requiring educators to attend professional development workshops and seminars or receive college course credit in classes that cover this topic. Once teachers have a greater understanding of how significant executive functioning skills are towards academic performance, this could motivate and encourage early childhood teachers to plan their daily lesson plans and routines with executive functioning practices embedded into them.

When early childhood teachers help their children create a strong or developing foundation in executive functioning skills, it can help them practice and strengthen these skills overtime and eventually gain the ability to exhibit effective executive functioning skills independently as they get older, especially as expectations and tasks become more challenging. For example, if children practice their executive functioning in class by learning how to successfully follow directions during a teacher-lead art project and implement those directions onto their own artwork, this can translate to an adolescent learning new academic material and applying their knowledge in an exam or project or an adult participating in a new job training and being able to comprehend and implement those newly learned skills that are necessary for acceptable job performance.

These findings also give some reassurance that it might take some time for children to really begin to create a stable foundation in executive functioning skills, so if a child is having some executive functioning problems in early childhood, it does not necessarily mean they are destined to struggle in this area in the future because a lot of growth and development can occur

within those formative years. Whether formal behavioral interventions are implemented in school or at home or children are simply gaining more practice in strengthening these skills by participating classroom routines and even observing teachers and other children taking on these actions, these experiences can help make a difference in their executive functioning skills overtime.

Future Directions

Measuring Self-Regulation Through Alternative Methods and Perspectives

Some future directions for evaluating the associations between early self-regulation and academic performance and school attendance records could involve measuring self-regulation in a natural school setting. This could create an alternative approach for the original HTKS measure, which was evaluating executive functioning skills, because observing the children in a natural setting might represent their executive functioning skills that they utilize on a daily basis in school more accurately. This approach could also involve classroom observations or rating scales rated by the teacher and a separate evaluator. This might provide different results especially since it is more of an observational measure in a natural setting when the child is unaware that they are being observed and assessed. This natural setting and being unaware they are being observed and assessed might produce more accurate and authentic results since the child will more likely be exhibiting behaviors based on everyday experiences in the school setting.

Along with assessing self-regulation in the natural classroom setting in order to measure the executive functioning component within self-regulation, it would also be beneficial to measure the emotion regulation component within self-regulation in this natural classroom setting. This could create an alternative approach to the original ERC measure by incorporating

the teacher's perspective. The original ERC measure incorporates the mother's perspective based on home and family experiences, but the child's emotion regulation skills might differ at home compared to in the classroom. Having a teacher's perspective involved could be beneficial because it could represent a more accurate representation of how children's emotion regulation abilities are perceived in the classroom. This could be an effective approach because their teachers might have a better understanding of who that child is as a whole and how their behaviors correspond to everyday classroom routines. For example, an assessor might observe a child exhibiting challenging behaviors one day, but their teacher might understand that the child is having a harder day in particular due to big changes happening at home, such as moving to a new house or a death of a family member. Since the teacher most likely knows more background information on their students based on the school setting, they might be able to rate or critique their student's self-regulation abilities more accurately based on their observations and interactions in the classroom.

Investigating Alternative Forms of Maternal Involvement

Non-School Related Maternal Involvement. Since maternal involvement did not make a difference in children's academic performance and school attendance records, these results could also imply that this research model did not examine the most significant types of maternal involvement. This current study focused on maternal school and literacy involvement, but it did not investigate other types of maternal involvement, which could be characterized as daily parenting techniques or being involved in their children's extracurriculars, such as a sports team or club. Since maternal school involvement did not create a significant change in the relationship between self-regulation in early childhood and academic performance, future studies could possibly examine if other forms of maternal involvement could create a significant change in this

association. Future studies could possibly investigate if having a mother volunteer as her child's soccer coach could create a significant change in the association between self-regulation academic performance, especially since activities like organized sports teams provide children with opportunities to practice and challenge their executive functioning skills.

Forming Family Communities. Since this study mainly focused on maternal involvement through parent-teacher interactions, volunteering with school related functions, and literacy involvement at home, it would be helpful to examine other school related forms of family involvement, such as families building relationships with other families in their child's school. When families form this sense of community with other families, these connections can possibly influence their children's self-regulation development and motivation towards school (Morton, 2017; Safron, 2017). If families form these connections with each other, they might be more inclined to set up playdates outside of school and give their children the opportunity to bond and possibly challenge and strengthen their self-regulation skills during the process of forming peer-relationships and even encountering conflicts along the way (Morton, 2017; Oberle et al, 2018; Orth et al., 2014; Safron, 2017). In addition, when children strengthen these peer-relationships outside of school, this could give them a greater chance of maintaining and strengthening these stable peer-relationships to act as social-emotional support at school, which can influence them to have more meaningful and positive school experiences (Oberle et al, 2018; Orth et al., 2014).

Measuring School Involvement Through Multiple Caregivers' Perspectives

Caregiving for young children is not typically a one-person job; the different tasks and responsibilities involve providing care for young children can often be led by multiple caregivers, such as a co-parent, extended family members, or a nanny (Barnett et al., 2016;

Bratsch-Hines et al., 2017). Since the PTI and HLEQ did not create any significant differences between the associations between self-regulation and academic performance and school attendance, it could be helpful for other caregivers involved in the child's life to fill out the PTI and HLEQ to evaluate their levels of school and literacy involvement. Especially for young children, it is possible that they might have multiple caregivers, such as other family members or friends who watch them when their mother is unavailable due to their own career, education, or personal obligations (Barnett et al., 2016; Bratsch-Hines et al., 2017). Even though mothers' average ratings on the PTI subscales were not very high, with approximate average scores of two points, it is possible that other family members or caregivers are participating more directly in these parent-teacher interactions or volunteering opportunities. Therefore, if another family member or caregiver who was a more active participant in these school related activities, their average scores might be higher and represent higher levels of school involvement.

The average score for the HLEQ subscale was approximately four points, which was more on the higher end of the scale and represented mothers implementing literacy activities approximately three to four times a week at home. Although mothers' average ratings on this subscale were closer to the higher end of the scale compared to the PTI subscale, it could still be helpful to measure literacy involvement through other family members' perspectives in the household.

Having multiple caregivers fill out the PTI and HLEQ can provide opportunities for comparisons to see if caregivers are more inclined to be involved in a certain area over others. For example, the existing data from this study demonstrated that mothers seemed to have higher scores on the HLEQ than the PTI subscales, so this could relate to mothers being more actively involved at home than at school. Therefore, if another caregiver has higher scores on the PTI

subscales, but lower scores on the HLEQ subscale, it could be possible that this particular caregiver is more actively involved in school-based activities. This could also be an effective assessment to evaluate the distribution of family involvement in the household, whether or not there is an approximate equal balance between the caregivers in relation to family involvement.

Examining Associations Between Emotion Regulation and Empathy Development

Even though emotion regulation did not have a strong association with academic performance in this study, this could encourage researchers and educators to examine other potential areas in which emotion regulation might have a more significant impact on, such as children's levels of empathy by the time they are in 3rd grade or older. According to previous literature, when children are able to regulate their emotions in an effective and healthy manner, they are most likely able to develop a high self-esteem, which can help them communicate and collaborate with others comfortably and effectively, which can lead to forming meaningful and supportive relationships. When children are able to communicate and form meaningful relationships with others, this can help strengthen their sense of empathy towards others by understanding how other people might be feeling based on different contexts (Oberle et al, 2018; Orth et al., 2014). Therefore, examining if high emotion regulation abilities established in early childhood are associated with high empathy towards others by the time they are in elementary school or older could be a potential implication for future studies.

Including Additional Considerations When Distinguishing Chronic Absenteeism

While measuring chronic absenteeism in 3rd grade, it could be beneficial and more informative to evaluate the explanations for school absence under more specific categories. For example, when a parent notifies the school that their child will be absent for the day, schools can ask the parent for the reason why they are absent. The choices for explaining why the child will

be absent could be related to these categories: (1) illness, (2) hospitalization/recovery, (3) vacation, (4) expulsion or suspension, and (5) personal/family reason (e.g., parent responsibilities, death of a family member, religious holiday, etc.). Organizing reasons behind being absent might open up some opportunities to examine specific reasons why this child is absent for at least 10% of the school year and discover any differences between the provided reasons. For example, maybe some children are more likely to be chronically absent due to frequent hospitalization reasons than due to expulsion or suspension from school.

Self-Regulation Skills Increase and Transform Over Time

The different ways in which self-regulation abilities are exhibited can vary based on the developmental stage an individual is in. Infants begin to self-regulate by sucking on fingers or pacifiers when distressed and as they transition into early childhood, children begin to focus their attention for short periods of time and eventually begin to learn how to regulate their emotions when by utilizing coping mechanisms with support from an adult (Rosanbalm & Murray, 2017a). As children transition into adolescence and early adulthood, self-regulation skills still continue to develop and become more complex as expectations and responsibilities increase overtime. Due to increased expectations and responsibilities, adolescents and young adults' decisions could lead to more influential consequences that could affect their own future and others around them (Rosanbalm & Murray, 2017b). In relation to these emerging and developing self-regulation skills, a main component on why children are able to have the capacity to exhibit and practice these abilities in more complex ways over time is due to changes in brain development (Johnson et al., 2010; Rosanbalm & Murray, 2017b). The frontal lobes of the brain are actually not fully developed until an individual reaches early adulthood, and the frontal lobes control one's ability

to control impulses, unitize their working memory, and demonstrate decision making and planning actions (Johnson et al., 2010).

Although these results only measured children's self-regulation in early childhood, this can inform researchers, educators, and caregivers that self-regulation skills begin at infancy and continue develop throughout childhood and early adulthood. Especially since individuals encounter different and more complicated problems overtime due to being involved in different contexts or situations, these conflicts might require more advanced self-regulation abilities in order to resolve the conflict appropriately (Johnson et al., 2010; Rosanbalm & Murray, 2017b). Since self-regulation skills continue to develop and might require more complex approaches overtime, this could also inform education professionals and caregivers that children might still need guidance and support in these areas, including adolescents and young adults (Rosanbalm & Murray, 2017b). Regardless of the developmental stage an individual is in, it can be beneficial for an adult or mentor to create a warm and nurturing environment in order to promote a safe space where they can make mistakes and gain opportunities to practice and grow in self-regulation, decision-making, and problem-solving skills.

Appendix A

Table A1

Head Toes Knees Shoulders

Item	Source
Part 1	Adapted from Ponitz et al., 2008
1. Touch your head	
2. Touch your toes	
3. Touch your toes	
4. Touch your head	
5. Touch your toes	
6. Touch your head	
7. Touch your head	
8. Touch your toes	
9. Touch your head	
10. Touch your toes	
Part 2	
11. Touch your head	
12. Touch your toes	
13. Touch your knees	
14. Touch your toes	
15. Touch your head	
16. Touch your shoulders	
17. Touch your knees	
18. Touch your knees	
19. Touch your shoulders	
20. Touch your toes	
Part 3	
21. Touch your shoulders	
22. Touch your head	
23. Touch your knees	
24. Touch your toes	
25. Touch your toes	
26. Touch your knees	
27. Touch your shoulders	
28. Touch your head	
29. Touch your head	
30. Touch your shoulders	

Table A2

Emotion Regulation Checklist

Item	Source
1. Shows wide mood swings (child moves quickly with a positive to a negative mood, so the way s/he is feeling can be hard to predict or expect).	Adapted from Choi & Oh, 2014
2. Transitions well from one activity to another; doesn't become angry, anxious, distressed, or overly excited when moving from one activity to another. (reversed scored)	
3. Can recover quickly from upset or distress (for example, doesn't pout, stay in a bad mood, seem anxious or sad after becoming upset). (reversed scored)	
4. Is easily frustrated.	
5. It is easy for this child to become very angry or have a tantrum.	
6. Is able to delay gratification or wait a little for something s/he wants, such as a favorite treat; hassled-control. (reverse scored)	
7. Easily has outbursts of energy and excitement that are unpleasant or disruptive.	
8. Responds angrily when adults set limits or make rules.	
9. Is overly eager ("in your face") when trying to get others to play with him/her.	
10. Is impulsive; speaks or acts before thinking about consequences or what will happen.	
11. Shows excitement that others find annoying, intrusive, or disruptive. Intrusive here means that other feel kind of overpowered, like their space is invaded or boundaries are crossed.	
12. Shows negative emotions when trying to get others to play with him/her.	

Table A3

Parent Teacher Involvement Questionnaire

Item	Source
Parent's Involvement and Volunteering at School 1. In the past year, you stopped by to talk to your child's teacher. 2. In the past year, you have visited your child's school for a special event (such as a book fair). 3. In the past year, you have attended a parent-teacher conference. 4. In the past year, you have attended PTA meetings. 5. You send things to class like story books and other things. 6. You help with your child at home with subjects that he/she is having difficulty with. 7. You take your child to the library. 8. You make sure that your child gets his/ her homework done. 9. You volunteer at your child's daycare or school. Frequency of Parent-Teacher Contact 1. In the past year, you have called your child's teacher. 2. In the past year, your child's teacher has called you. 3. In the past year, you have written your child's teacher. 4. In the past year, your child's teacher has written you.	Miller-Johnson & Maumury-Gremaud, 1995

Table A4

Home Literacy Environment Questionnaire

Item	Source
Parents' Involvement in Literacy-Related Activities: 1. About how many times per month do you read to your child at home? 2. About how many times per month do you go to the library with your child? 3. About how often do you try to teach your child the letters of the alphabet? 4. About how often do you play rhyming games with your child? 5. About how often do you point out words to your child and tell him/ her what they say?	Farver, Xu, Eppe, & Lonigan, 2006; Farver, Xu, Lonigan, & Eppe, 2012

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