

Behavioral Trajectories: An Analysis of Growth Patterns and Predictors of Changes from Preschool to First Grade

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ABSTRACT

The purpose of this study is to investigate the behavioral trajectories of children from preschool to First Grade and how the behavioral changes relate to children's demographic information. We track 233 children's change throughout the duration of three years from preschool to First Grade from fall, 2011 to spring, 2014 (6 time points). Participants are 233 children from Grades One and Two. PROC MIXED in SAS ® 9.4 is used for data analysis. Linear mixed models are selected to investigate the personal variation in behavioral changes. Results indicate that children's externalizing problems are stable over time, while children's internalizing problems decrease over time. Children's adaptive skills increase at the beginning but decrease at the end of First Grade. Boys and free/reduced lunch status children are with more problems at the beginning of preschool. We also find significant gender (English language status) differences on adaptive skills over time. The information can assist teachers, school psychologists, and others who are concerned with children's behavioral and emotional health.

INTRODUCTION AND THEORETICAL FRAMEWORK

The last four decades have witnessed the number of preschoolers attending center-based programs dramatically increase (Fuligni, Brooks-Gunn, & Berlin, 2003). At the same time, many children enrolling in preschool exhibit behavioral and social-emotional problems (Conroy & Brown, 2004). It is well known that young children's behavioral and emotional development is related to their school academic performance and later success (Roeser, 2001). Thus, ensuring young children's behavioral health merits concern from educators, school psychologists and parents. Additionally, young children's behavioral and emotional changes can be associated with their personal characteristics, such as gender, ethnicity, and language (Dawson & Williams, 2008; Koepke & Harkins, 2008). The transition from preschool to First Grade is important for young children. Consequently, the study of children between preschool and First Grade provides an optimal place to investigate how behaviors develop and change during this period.

The Behavioral and Emotional Screening System (BESS), which is designed to determine behavioral and emotional strengths and weaknesses in students from preschool to high school, were used in the current study. The result of the form contains three dimensions, which are internalizing problems, externalizing problems, and adaptive skills. Externalizing Problems measures children's tendencies to display aggressive or hyperactive behaviors or inattentiveness in the classroom. Internalizing Problems includes children's tendencies to show feelings of anxiety, worry, or stress. The Adaptive Skills Construct measures students' social development and their quality of interaction with peers and authority figures. As Kamphaus and Reynolds (2007) mentioned, "BESS was designed to be a reliable and accurate predictor of a variety of behavioral and emotional problems." The Behavioral and Emotional Screening System Teacher Rating Scale will be used. This is because (1) teachers commonly observe various aspects of children in the classrooms and are able to identify young children's daily behaviors accurately (Flanagan, Bierman, & Kam, 2003) and (2) teachers have the advantage of observing children within the same class, allowing them to make a comparatively objective decision.

The studies of children between preschool and First Grade provide an optimal place to investigate how behaviors develop and change during this period. The study conducted by DiStefano and Kamphaus (2008) employed a latent growth curve model to detect children's behavior change in the first three years at elementary school. They found that children's maladaptive and adaptive behaviors decreased. There are few studies that focus on children's development between preschool and First Grade.

Studies about the development of young children's behaviors in three subscales showed different trends. Spieker et al., (1999) tracked 183 preschoolers' behaviors from age 3.5 to 6 years old using latent growth curve modeling. They found that children's disruptive behavior problems decreased, but the behavioral trajectories are different due to gender. Gilliom and Shaw (2004) investigated behavioral change using a sample of 303 boys aged from 2 to 6. According to their findings, the internalizing problems gradually increased, whereas externalizing behaviors gradually decreased over time. There is little research on development of children's adaptive skills. The environmental effects of schools that support behavioral adjustment are stable (Masten, 2001), so the adaptive skills may be stable over time.

Current research suggests that gender moderates many early behavioral and emotional problems regardless of other demographic information (e.g., race and socio-economic status) (Chatterji, 2006). Young males are at higher risk for developing academic, social, and emotional difficulties compared with girls in educational settings (Pollack, 1998).

Besides gender, children's other demographic characteristics, i.e. ethnicity, socio-economic status, limited English language status, may also impact their exhibition of at-risk behaviors (Dawson & Williams, 2008). Thus, the purpose of the current study is to investigate three dimensions of BESS scores to determine how their behaviors may change from preschool to First Grade. Additionally, we plan to examine the role of gender, ethnicity, socio-economic status (indicated by their free/reduced lunch status) as well as English language proficiency in behavioral trajectories during this time period.

The following research questions are of interest:

1. How does behavior change in three subscales (externalizing problems, internalizing problems, and adaptive skills) over time?
2. Are children's demographic characteristics (i.e. gender, ethnicity, socio-economic status, English language proficiency) related to the initial status in children's behaviors at preschool?
3. Are children's demographic characteristics (i.e. gender, ethnicity, socio-economic status, English language proficiency) related to changes in children's behaviors (cross-level interaction)?

METHODS

Data in this proposed study initially come from an Institute for Education Sciences funded grant project. Preschool teachers from 10 elementary schools or child development centers provided ratings of children's behavior using BESS. The purpose of the study is to track children's behavior as they transition from preschool to First Grade. Teachers completed the BESS forms each semester during this time period. As mentioned above, problems in three dimensions are considered using related items: Internalizing problems, Externalizing problems, and Adaptive Skills. The three dimensions will be considered independently in the current study. The raw scores of each dimension are transformed into T scores using the mean and standard deviation from the norm database. Each item is rated on a Likert scale from "never", "sometimes", "often" to "almost always". Higher scores in Externalizing and Internalizing Problems indicate more problems in the related areas, while lower scores in Adaptive Skills indicate more problems in the related areas.

Data was collected in the fall and spring of each academic year. We tracked children's change throughout the duration of three years from preschool to First Grade from fall, 2011 to spring, 2014 (6 time points). In addition to the BESS information, children's demographic information, such as gender, socio-economic status, and ethnicity, was collected. The sample of children rated by the teachers is predominantly minority (66.09%) and on free/reduced lunch (86.27%). Relatively few (18.88%) students speak a language other than English.

We hope to understand "the characteristics of the individual's developmental pattern as compared to their peers" (DiStefano & Kamphaus, 2008). We consider the personal variation in their behavioral changes, thus the linear mixed effects models is suitable for this condition because subsets of regression parameters vary randomly from one individual to another, which considers the natural heterogeneity in the population. The model is appealing because (Fitzmaurice, Laird, & Ware, 2011):

1. It has the flexibility in accommodating any degree of missing in the data set. It is good for our dataset because some children moved during the three-year period, so we do not have the access to their information.
2. It has the flexibility in accommodating different designs and can parsimoniously model the variance correlation.

We ran our growth models using PROC MIXED method (SAS ® 9.4). The analysis plan covered 3 stages. First, the basic descriptive information of the outcomes of different time points was provided. Then, we planned to determine the change of behavioral constructs between preschool and First Grade. The three outcomes were treated as continuous variables. Finally, we planned to investigate if behavioral changes in three subscales/overall problems are related to children's gender, ethnicity, lunch status, and English language proficiency. Graphs were created to show the results.

RESULTS

A total of 233 children were tracked from fall, 2011 to spring, 2014. The basic descriptive information for the time variable across each time point was reported in Table 1. The time variable was coded as 0, 6, 12, 18, 24, and 30 months. The code of 0 represents the beginning of preschool in fall, 2011; 6 represents spring, 2012. Similarly, 12 months is the beginning of kindergarten in fall, 2012 and 18 months is spring, 2013; 24 months is the beginning of First Grade in fall, 2013 and 30 months is spring, 2014. For each subscale, different average scores were identified for each time point. The children's demographic information was provided in Table 2.

Next, we examined the distribution of average outcome scores between boys and girls for each time point. The results were given in Figures 1, and 2 and 3. Boys always showed higher scores on the externalizing problems and internalizing problems and lower scores on the adaptive skills compared with girls. It seemed like there were big differences between boys and girls on the externalizing problems in all time points. In addition, their score differences

were different in different time points. Compared to students who paid for their lunch, students who received free/reduced lunch also appeared to have higher scores on the externalizing and internalizing problems and lower scores on the adaptive skills. Different ethnicity and English language status groups had a mixed picture.

An independent investigation of externalizing problems as the outcome was conducted first. Similar procedures were repeated for internalizing problems and adaptive skills. The following model steps were followed:

1. The unconditional model was developed to see the percentage of variability that can be explained by time and children level variables.
2. The time predictor was added to the model by assuming the random intercept (allowing the initial status to vary). Quadratic term was added as well.
3. Then the random intercept of time was added to improve the model if possible. As mentioned above, we hoped to consider the personal behavioral trajectories. The first research question would be answered after this step.
4. Finally, the demographic variables and interaction between demographic information and time (quadratic term) would be added to the model to answer the second research question.

To compare the fixed effects difference across models, the maximum likelihood (ML) estimation method was used. To compare the random effects difference across models, the restricted maximum likelihood (REML) estimation method was used. The deviance differences between models were compared. The significance of predictors was considered as well. Due to page limitations, we did not provide all the output information in the results section while the basic model building process was given.

	N	Minimum	Maximum	Mean	SD
Externalizing problems fall, 2011	233	41.15	93.45	50.48	12.04
Externalizing problems spring, 2012	224	41.15	85.98	49.72	10.67
Externalizing problems fall, 2012	225	40.80	90.96	51.70	11.83
Externalizing problems spring, 2013	224	40.80	90.96	51.37	11.77
Externalizing problems fall, 2013	176	40.80	82.15	51.55	10.50
Externalizing problems spring, 2014	157	40.80	87.32	51.16	11.30
Internalizing problems fall, 2011	232	38.69	92.82	49.27	11.73
Internalizing problems spring, 2012	223	38.69	90.25	48.31	10.96
Internalizing problems fall, 2012	221	38.69	92.82	48.51	11.51
Internalizing problems spring, 2013	223	38.69	106.13	48.41	10.51
Internalizing problems fall, 2013	176	39.42	80.02	46.42	9.17
Internalizing problems spring, 2014	158	39.42	91.63	46.41	8.96
Adaptive Skills fall, 2011	229	30.78	69.15	51.21	10.09
Adaptive Skills spring, 2012	224	28.76	69.15	54.56	10.40
Adaptive Skills fall, 2012	228	30.78	78.79	54.00	11.26
Adaptive Skills spring, 2013	216	29.79	78.79	52.37	12.26
Adaptive Skills fall, 2013	176	29.79	78.79	49.53	12.13
Adaptive Skills spring, 2014	158	29.79	78.79	50.55	14.33

Table 1. Descriptive Statistics – Time Variables

Variables		Frequency (Percentage)	
N=233	Gender	Female 111 (47.6%)	Male 122 (52.4%)
	Ethnicity	Minority 154 (66.1%)	Majority 79 (33.9%)
	Lunch Status	Free/Reduced 201 (86.3%)	Paid 32 (13.7%)
	English Language status	Non-English 44 (18.9%)	English 189 (81.1%)

Table 2. Descriptive Statistics of Student Demographics

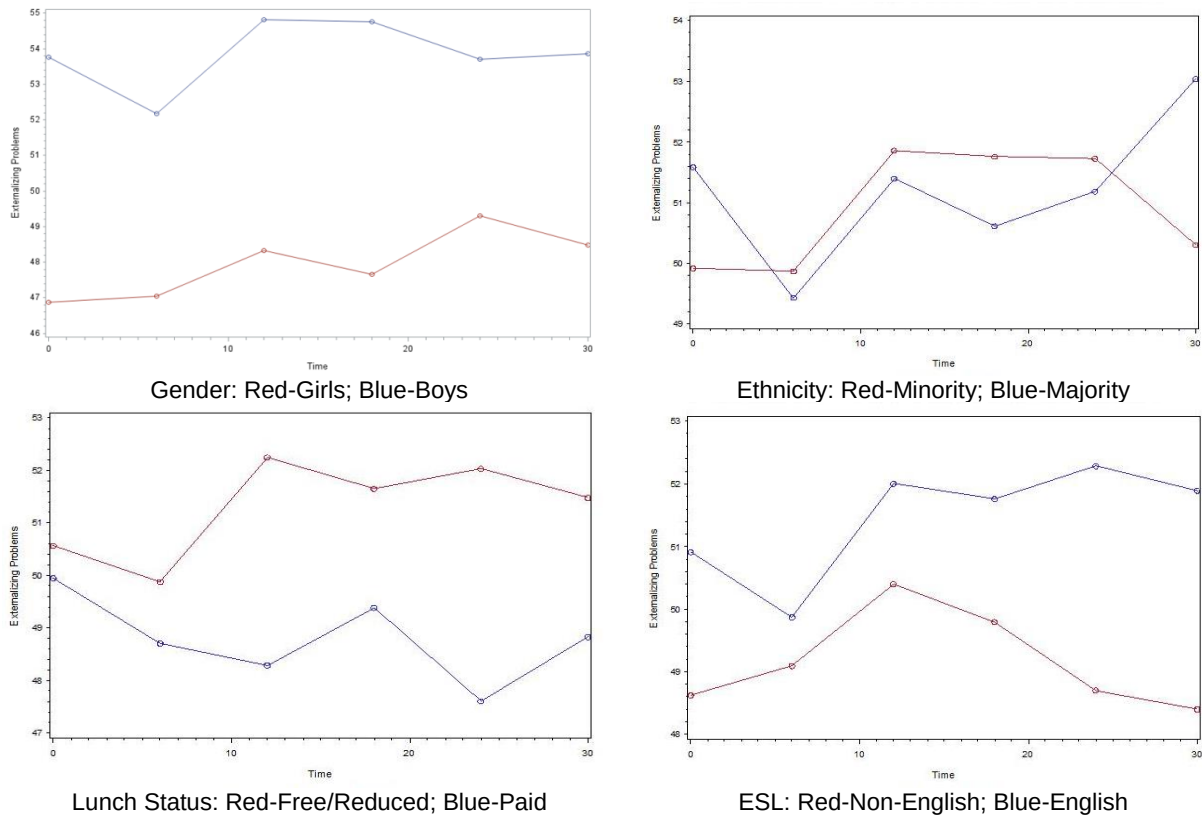


Figure 1. Average Externalizing Problems between Different Groups from Preschool to First Grade

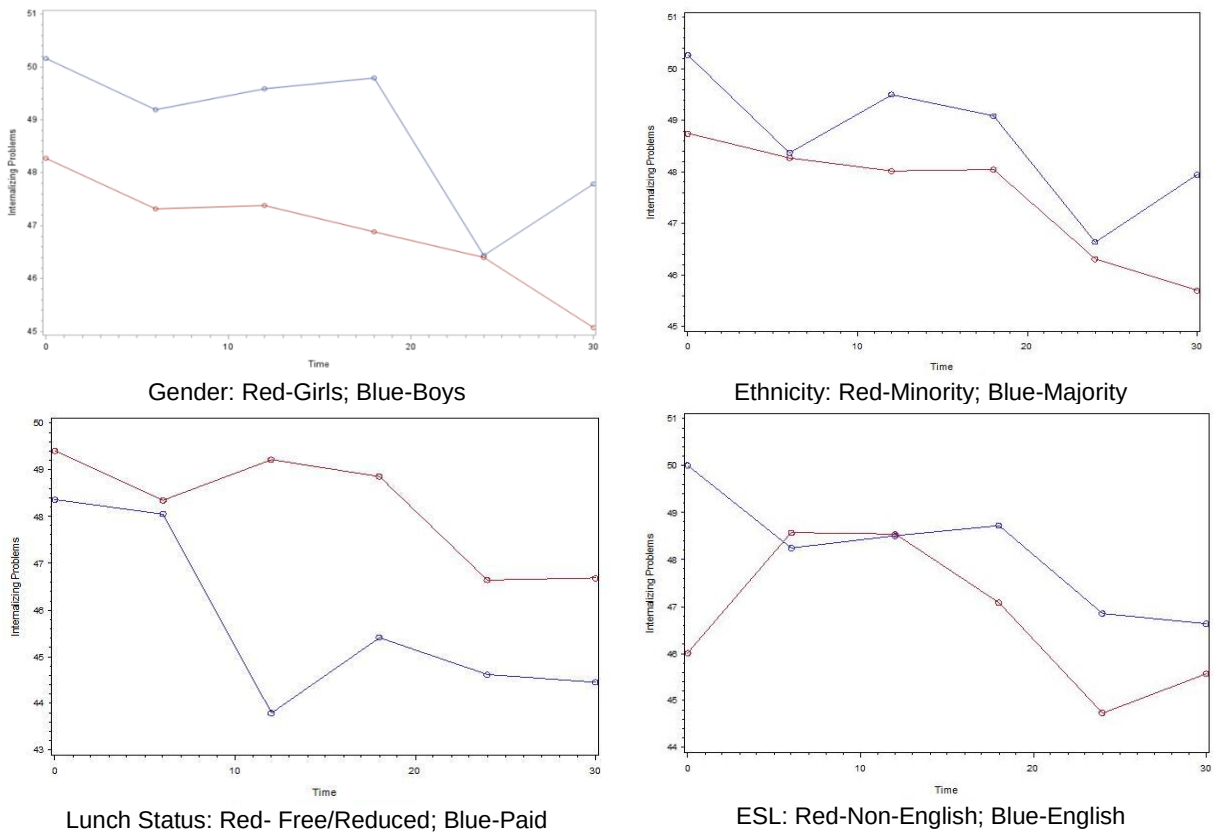


Figure 2. Average Internalizing Problems between Different Groups from Preschool to First Grade

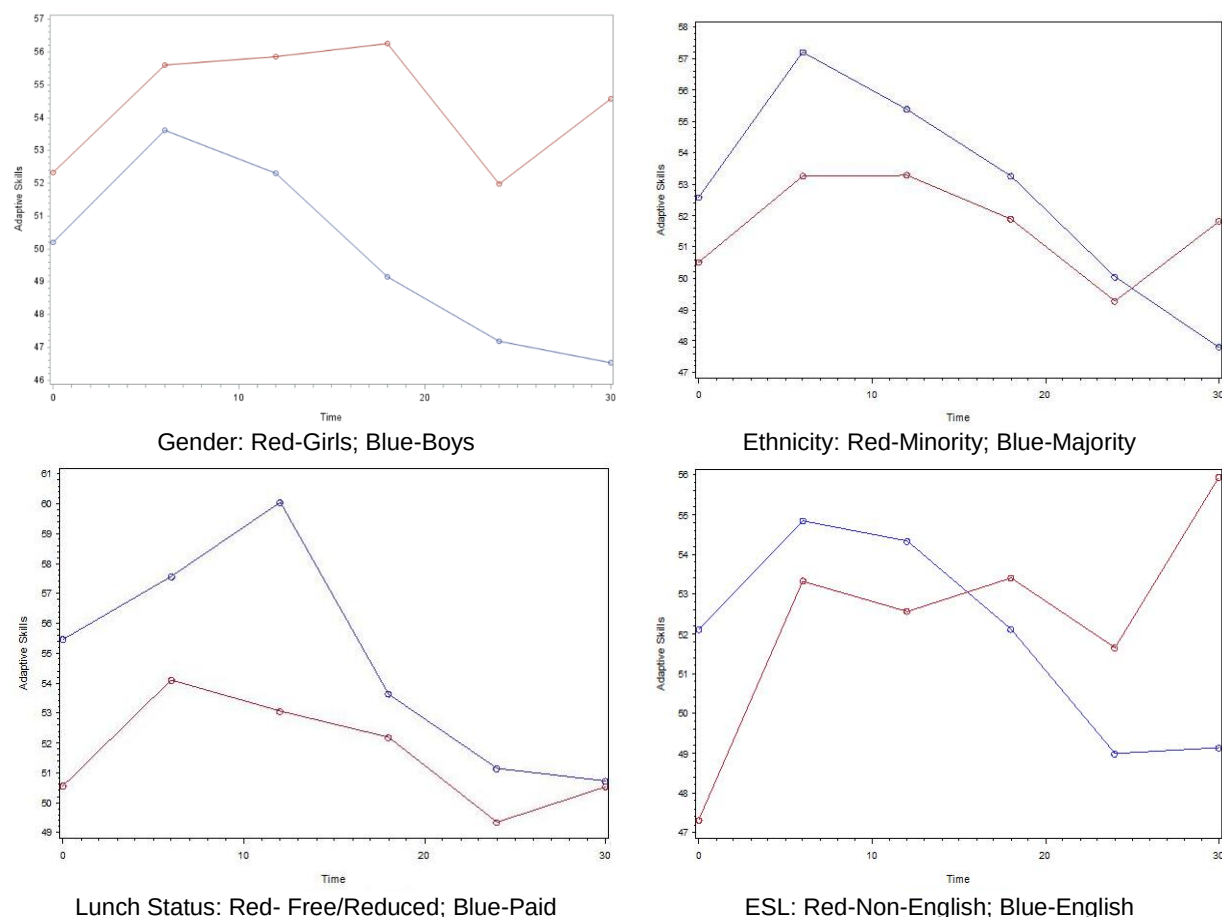


Figure 3. Average Adaptive Skills between Different Groups from Preschool to First Grade

EXTERNALIZING PROBLEMS TRAJECTORIES

First, the unconditional model without any predictor indicated that the percentage of variability that could be explained by the children level characteristics (ICC) was about 62%. In other words, 38% of the variance in the externalizing problems scores was related to time.

Next, the model building procedure was followed. The time variable and a quadratic time were added to the model accordingly. The time variable was kept due to its significance ($0.047, p=0.021$) and increase of model fit ($8868.6-8863.3, df=1, p<0.05$). However, the quadratic term was removed because it was not a significant predictor ($-0.002, p=0.283$) and the model fit was not significantly improved ($8863.3-8796.9, df=2, p<0.05$). It was noted that the externalizing problems did not change over time after considering the individual differences ($0.041, p=0.143$). Then the demographic variables were added to the model accordingly before another model that included their interaction terms was tested. First, there was significant gender difference ($6.77, p<0.05$) and lunch status difference ($-4.42, p<0.05$) in the predicted externalizing problems at the beginning of preschool (i.e., boys had more externalizing problems compared to girls; and students with free/reduced lunch status had more externalizing problems than students who paid for their lunch). These two predictors were kept in the model due to better model fit ($8792.5-8758.1, df=4, p=0.05$). However, none of the interactions between demographic variables and time was significant. Children's various demographic differences were not significantly related to externalizing problem patterns. The model fit did not improve at all. According to the above procedure, the final model included fixed effects of time, gender, lunch status and random effects of time.

INTERNALIZING PROBLEMS TRAJECTORIES

First, the unconditional model without any predictor indicated that the percentage of variability that could be explained by the children level characteristics (ICC) was about 40%. In other words, 60% of the variance in the internalizing problems scores was related to time.

Next, the model procedure from step 2 to 4 was employed to find the optimal model. The time variable and a quadratic

time were added to the model accordingly. Time was significantly related to the outcome variable ($-0.09, p < 0.05$). The model fit was significantly improved as well ($9065.5-9050.3, df=1, p < 0.05$). However, the quadratic term was removed because it was not a significant predictor ($-0.002, p = 0.369$) and the model fit was not significantly improved by the term ($9050.3-9046.9, df=1, p > 0.05$). Next, the random effects of time (type=un) was added to the model to provide better model fit ($9055.5-8990.1, df=2, p < 0.05$). Thus, the internalizing problems did decrease over time ($-0.10, p = .002$). Then various demographic variables and their interactions were subsequently added to the models. There was significant gender difference ($2.54, p < 0.05$) and lunch status difference ($-3.97, p < 0.05$) in the predicted internalizing problems at the beginning of preschool (i.e., boys had more internalizing problems compared to girls; and students with free/reduced lunch status had more internalizing problems than students who paid for their lunch). These predictors were kept in the model due to better model fit ($8985.4-8972.1, df=4, p < 0.05$). However, none of the interactions between demographic variables and time was significant and no significant model improvement was identified. According to the above procedure, the final model included fixed effects of time, gender, lunch status and random effects of time. This is similar as the final model for the Externalizing Problems.

ADPATIVE SKILLS TRAJECTORIES

First, the unconditional model without any predictor indicated that the percentage of variability that could be explained by the children level characteristics (ICC) was about 46% and 54% of the variance in the adaptive skills scores was related to time.

Next, the similar procedures were used to find the optimal model. The time variable and a quadratic time were added to the model accordingly. Both time ($0.26, p = 0.001$) and the quadratic term ($-0.01, p < 0.05$) were significantly related to the outcome variable. They were kept in the model because of the better model fit as well ($9185.3-9153.0, df=2, p < 0.05$). Next, the random effects of time (type=un) was added to the model to provide better model fit ($9167.8-9050.8, df=2, p < 0.05$). It appeared there was an increase in adaptive skills over time, but it dropped after certain time points based on the negatively significant quadratic term.

Then all four children demographic variables were subsequently added to the model. There was significant gender difference ($-4.12, p < 0.05$) and lunch status difference ($4.62, p < 0.05$) in the predicted adaptive skills at the beginning of preschool (i.e., boys had lower adaptive skills compared to girls; and students with free/reduced lunch status had lower adaptive skills than students who paid for their lunch). These predictors were kept in the model due to better model fit ($9036.7-9013.0, df=4, p < 0.05$). Next, interaction terms were added. Results indicated that the interactions between demographic variables gender and time, English language status and time were significant (for gender and time: $-0.186, p = 0.007$ and for English language status and time: $-0.242, p = 0.005$). This suggested that boys had lower growth rate than girls over time; and that children who were non-English speaking had lower growth rate than those who were English proficient. Furthermore, the interactions between demographic variables gender, English language status and time square were also significant (for gender and time square: $-0.006, p = 0.016$ and for English language status and time square: $-0.007, p = 0.014$). These two were compared and although both of them got significant results and better model fit, the interaction between gender and time, English language status and time was selected based on better model fit (8995.5 vs 8996.8). The final model included fixed effects of time, time square, gender, lunch status, interaction between time and gender, and interaction between time and English language status. Random effects of time and time square were considered. Interestingly, significant cross-level interactions between time and gender and English language status were found. In other words, the rate of change between boys and girls were different across different time periods; the rate of change among different language status was not the same either.

The predicted mean plots were created for the adaptive skills to explain the cross-interactions for different demographic groups (Figure 4 and Figure 5). It seemed like the adaptive skills gap was small at the beginning of preschool, but the gap was more obvious at the end of First Grade in both graphs. The change rate of mean predicted adaptive skills was significantly slower for girls and non-English speaking children.

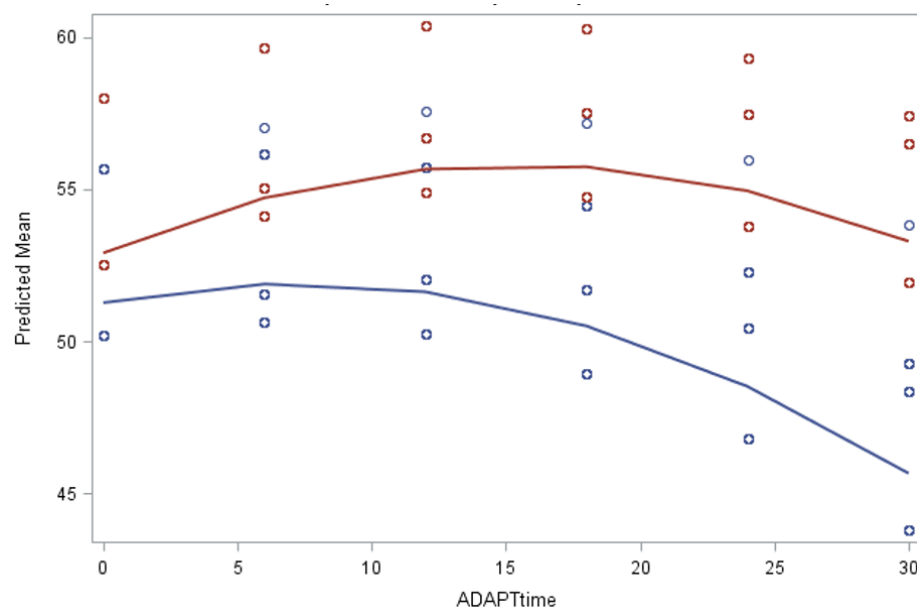


Figure 4. Predicted Mean Plot between Boys and Girls (Red: Girls; Blue: Boys)

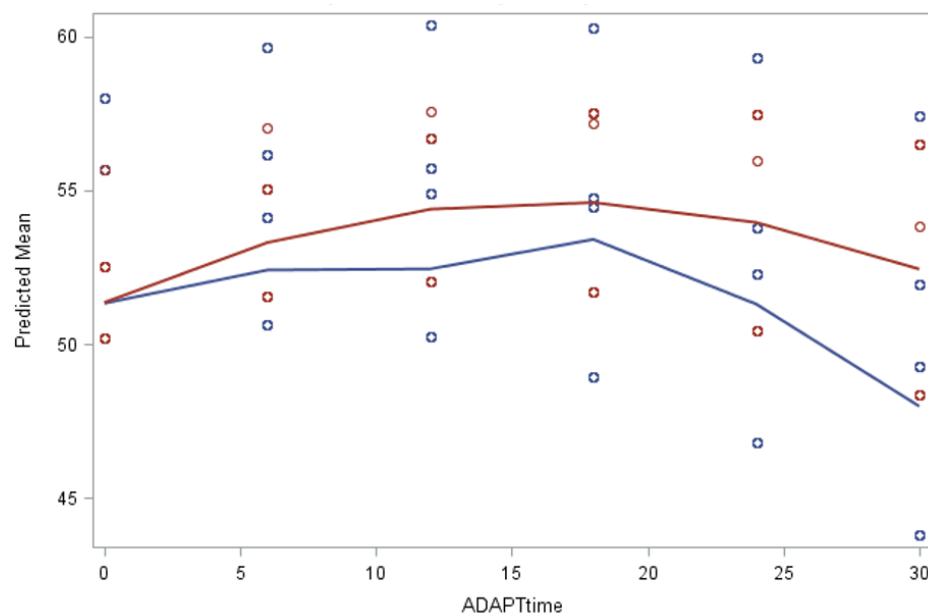


Figure 5. Predicted Mean Plot for Children in Different Language Status (Red: Non-English; Blue: English)

The research questions were answered for each behavioral subscale score. The fixed and random effects estimates of the three final models were included in the following table (Table 3). Finally, model diagnostic was performed to check the transformed residual distribution and relationship with the predicted mean (vciry). No obvious outlier and systematic patterns were identified.

	Externalizing Problems	Internalizing Problems	Adaptive Skills
<i>Fixed Effects</i>			
Intercept	47.39*	48.41*	52.51*
Time	0.04	-0.10*	0.49*
Time-square			-0.01*
Gender	6.80*	2.63*	-2.32
Gender*Time			-0.19*
Lunch Status	-4.20*	-3.36*	5.50*
ESL*Time			-0.15*
<i>Error Variance</i>			
Level-1	37.69*	55.01*	47.89*
Level-2 intercept	94.16*	91.69*	65.26*
Time	0.09*	0.11*	0.59*
Timesquare			0.0006*
L-2 intercept*Time	-1.45*	-2.41*	-2.54*
L-2 intercept*Timesquare			0.06
Time*Timesquare			-0.02*
Deviance	8760.2	8974.9	9003.3

* $p < 0.05$. Entries show parameter estimates.

Table 3. Final Models for Three Subscales (Method = ML)

CODE

The Adaptive Skills code is provided below. The procedure of the other two subscales is similar.

```

/*descriptive information*/
PROC MEANS DATA=project;
VAR EXT_TF1 EXT_TS1 EXT_TF2 EXT_TS2 EXT_TF3 EXT_TS3 INT_TF1 INT_TS1 INT_TF2 INT_TS2
INT_TF3 INT_TS3
ADAPT_TF1 ADAPT_TS1 ADAPT_TF2 ADAPT_TS2 ADAPT_TF3 ADAPT_TS3;
RUN;

PROC FREQ DATA=project;
TABLE sex ethnicity lunchstatus esl;
RUN;

/*get the long dataset*/
DATA proadapt;
SET project (keep = ID SEX ethnicity lunchstatus esl ADAPT_TF1 ADAPT_TS1 ADAPT_TF2
ADAPT_TS2 ADAPT_TF3 ADAPT_TS3);
ADAPT=ADAPT_TF1;ADAPTtime=0;OUTPUT;
ADAPT=ADAPT_TS1;ADAPTtime=6;OUTPUT;
ADAPT=ADAPT_TF2;ADAPTtime=12;OUTPUT;
ADAPT=ADAPT_TS2;ADAPTtime=18;OUTPUT;
ADAPT=ADAPT_TF3;ADAPTtime=24;OUTPUT;
ADAPT=ADAPT_TS3;ADAPTtime=30;OUTPUT;
DROP ADAPT_TF1 ADAPT_TS1 ADAPT_TF2 ADAPT_TS2 ADAPT_TF3 ADAPT_TS3;
RUN;

**adaptive skills plots;
/*Mean plot between boys and girls across six time points*/
PROC SORT DATA=proadapt;
BY adapttime sex;
PROC MEANS DATA=proadapt;
BY adapttime sex;
VAR adapt;
OUTPUT OUT=forplotadapt MEAN(ADAPT)=averageADAPT;
PROC PRINT DATA=forplotadapt;
TITLE 'Average Adaptive Skills for Three Years';
RUN;

```

```

GOPTIONS RESET = ALL;
TITLE1 "Mean plot over time_Adaptive Skills";
AXIS1 LABEL="Time";
      AXIS2 LABEL=(ANGLE=90 "Adaptive Skills") MINOR=(N=4);
SYMBOL1 VALUE=circle INTERPOL = join REPEAT=50;
PROC GPLOT DATA=forplotadapt;
PLOT averageADAPT*ADAPTtime=sex/HAXIS= AXIS1
      VAXIS= AXIS2;

RUN;
QUIT;

/*MODELS adapt*/
*unconditional MODEL*;
TITLE 'unconditional MODEL ext';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt=/S;
RANDOM intercept/SUBJECT=id;
RUN;

/*create a new quadratic term*/
DATA proadapt;
SET proadapt;
adapttimesq=adapttime*adapttime;
RUN;

TITLE 'RANDOM intercept only with time as the predictor';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt= adapttime/S;
RANDOM intercept/SUBJECT=id;
RUN;

TITLE 'RANDOM intercept only with time and timesq as the predictor-added';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt= adapttime adapttimesq/S;
RANDOM intercept/SUBJECT=id;
RUN;

TITLE 'RANDOM intercept only with time and timesq as the predictor-added';
PROC MIXED DATA=proadapt METHOD=reml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt= adapttime adapttimesq/S;
RANDOM intercept/SUBJECT=id;
RUN;

TITLE 'RANDOM intercept and RANDOM slope TYPE=un';
PROC MIXED DATA=proadapt METHOD=reml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt= adapttime adapttimesq/S CHISQ;
RANDOM intercept adapttime adapttimesq/SUBJECT=id TYPE=un;
RUN;

TITLE 'final MODEL time only';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id;
MODEL adapt= adapttime adapttimesq/S CHISQ;
RANDOM intercept adapttime adapttimesq/SUBJECT=id TYPE=un;
RUN;

TITLE 'RANDOM intercept and RANDOM slope TYPE=un add sex ethnicity esl lunchstatus';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id sex ethnicity esl lunchstatus;
MODEL adapt=adapttime adapttimesq sex ethnicity esl lunchstatus/S CHISQ;

```

```

RANDOM intercept adapttime adapttimesq /TYPE=un SUBJECT=id;
RUN;

TITLE 'RANDOM intercept and RANDOM slope TYPE=un add sex ethnicity esl lunchstatus and
interaction';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id sex ethnicity esl lunchstatus;
MODEL adapt=sex ethnicity esl lunchstatus adapttime adapttimesq adapttime*sex
adapttime*ethnicity adapttime*esl adapttime*lunchstatus /S CHISQ VCIRY;
RANDOM intercept adapttime adapttimesq /TYPE=un SUBJECT=id;
RUN;

TITLE 'RANDOM intercept and RANDOM slope TYPE=un add sex ethnicity esl lunchstatus and
interaction';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id sex ethnicity esl lunchstatus;
MODEL adapt=sex ethnicity esl lunchstatus adapttime adapttimesq adapttimesq*sex
adapttimesq*ethnicity adapttimesq*esl adapttimesq*lunchstatus /S CHISQ VCIRY;
RANDOM intercept adapttime adapttimesq /TYPE=un SUBJECT=id;
RUN;

TITLE 'Final MODEL Adaptive Skills';
PROC MIXED DATA=proadapt METHOD=ml COVTEST NOCLPRINT=10;
CLASS id sex ethnicity esl lunchstatus;
MODEL adapt=sex lunchstatus adapttime adapttimesq adapttime*sex adapttime*esl /S
CHISQ OUTPM=regpredmadapt VCIRY;
RANDOM intercept adapttime adapttimesq /TYPE=un SUBJECT=id;
RUN;

TITLE 'predicted mean plot Adaptive Skills';
PROC SGPLOT DATA=regpredmadapt;
SCATTER X=adapttime Y=pred /GROUP=sex; LOESS X=adapttime Y=pred /GROUP=sex;
RUN;

TITLE 'predicted mean plot Adaptive Skills';
PROC SGPLOT DATA=regpredmadapt;
SCATTER X=adapttime Y=pred /GROUP=esl;
LOESS X=adapttime Y=pred /GROUP=esl;
RUN;

```

CONCLUSION

The current study investigated the behavioral changes of children from preschool to First Grade. In sum, there were gender differences on children's behavioral problems in all three areas. Children's externalizing problems were stable over time, while children's internalizing problems decreased over time. Surprisingly, children's adaptive skills increased at the beginning but decreased at the end. Next, children's gender and lunch status were significantly related to children's initial status of behavioral and emotional problems. Boys and free/reduced lunch status children were with more problems. There were no significant cross-level interactions between demographic information and externalizing or internalizing problems. We found significant gender and English language status differences on adaptive skills over time. There were larger gaps at the end of the tracking period. The change rate of mean predicted adaptive skills was significantly slower for girls and non-English speaking children.

The study can help us identify children's behavioral changes at an early stage, which will be helpful for educators to work on children's transitional process between preschool and adaptive skills. For instance, children who were in First Grade may have difficulty adjusting to the new school environment (i.e., drop of the adaptive skills scores). This information can assist teachers, school psychologists, and others who are concerned with children's behavioral and emotional health. Since we consider the personal trajectories in behavior change, the results will be useful for school psychologists, parents, and teachers, who are interested in the individual patterns. The future study can use children's risk factor status (at risk or not) as the outcome to investigate the behavioral change to see if similar behavioral patterns hold.

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