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Diverse 3rd Grade Non-school Activity Participation Associations With Social Competence And Reading Performance

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DIVERSE 3RD GRADE NON-SCHOOL ACTIVITY PARTICIPATION: ASSOCIATIONS WITH SOCIAL COMPETENCE AND READING PERFORMANCE

by

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ABSTRACT

This study examined indicators of 3rd Grade students' non-school activity participation (NSAP) for associations with measures of social competence and reading performance. The Early Childhood Longitudinal Study (ECLS-K), representative of a 1999 kindergarten cohort of more than 14,000 students was used. The study constructed social competence composites from responses provided by students, parents and teachers. Principal component analysis and iterative bivariate correlations were utilized to derive the most robust composite for use in tests of the main hypotheses of the study. Results confirmed prior research findings that social competence has strong positive associations with academic performance. Thereafter, the social competence composite and ECLS Reading IRT Scale Score were used as alternative outcome measures in the bivariate analyses and linear regressions on non-school activity participation (NSAP) and breadth of non-school activity participation (BNSAP) scores.

Cluster and multiple regression analyses combined in the study and brought demographic and cognitive controls to bear on iterations of five distinct views of the independent variables. Results indicated that girls influenced the association strengths observed for NSAP, and boys seemed to drive the direction and strength of BNSAP associations. Although regression betas for total samples were nominal, when viewed by demographic cluster samples the values were appreciatively improved. The use of the cluster distinctions provided views of significant associations that were otherwise dissolved into nominal aggregates. The results of these analyses support the construct validity of applying the aggregate scoring metric of EAP research to NSAP. Regression results prompted a call for future inquiries into student self-selection.

I would like to dedicate the completion of my dissertation to my niece,
the late Dr. Jennifer Rene Young-Tait,

who was a darling professor at Hope College,
the first PhD in our family,
and who suffered complications during childbirth and went home to be with the Lord,
in the week before my originally planned defense of this research.

ACKNOWLEDGMENTS

I am proud of this research, and the work that was part of this doctoral candidacy. But, I could not be where I am today without the significant impressions and consistent encouragement that I have received from many persons in my life. Over five decades of schooling, teachers have always made learning a joy for me. Ms. Jessie Boerger, who challenged me with my first 'D', taught me to take education seriously. John Sexton's, often remembered, "Earl the Pearl moves" in civil procedure, provided inspiration for maintaining the enthusiasm in my own classrooms when I became a teacher. And, my true appreciation for learning principles came from my time with Dr. Joyce Honeychurch, who was the true mentor of my post-graduate aspirations.

I am particularly indebted to Dr. Jess House for my participation in this 5th (and final) cohort of the UCF at FGCU doctoral program. Being cast in an undergraduate production of Shakespeare's "As You Like It" during the first spring semester had caused Dr. House to doubt my commitment to the program. He was quite the taskmaster, and was dutiful to impress upon us the requirements of doctoral studies. My response was to perpetually raise the bar with each class presentation until I finally thought that I may have brought a smile to Dr. House's face with my Maximus: Servant Leader presentation. I did not want to fail Dr. House.

I really appreciated Dr. Gil Hutchcraft, who in our statistics prerequisite, made a lasting impression upon me by demonstrating a love for statistics, which was certainly contagious in my case. I devoured the statistics courses taught by Dr. Lea Witta and Dr. Debbie Hahs-Vaughn. However, thank you to all of the UCF professors who made the biweekly three hour drive down to Fort Myers to teach the marathon two-day sessions of our courses at FGCU. I can say for the entire cohort that we were well prepared for our comprehensive examinations.

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Living three hours away from Orlando, frustrated the face-time opportunities that may have prevented the confusion that precipitated my need to form a new committee. While making phone calls in desperation to find a chair, it was my great fortune to reach Dr. Karen Biraimah, who not only took my call seriously, but became an on-campus advocate for me until I had a chair, Dr. Bobby Hoffman, and a new committee. Thank you, Dr. Biraimah, for immediately seeing me as one of your students. Thank you, Dr. Hoffman, for instilling confidence in me, from your first comment on my writing that we could get this done. You know that I believe it was providential that we should meet on this committee, having previously appeared in the same commencement bulletin from Fairleigh Dickinson University nearly three decades ago.

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I am considerably blessed by the family that God allowed for me. My father Lomax ably represented to me the image of God, my mother Harrietta exhibited His grace, my stepmother Emogene poured out His love, and my stepfather Manuel taught me to respect His Word. They may all be at rest, with the knowledge that I have been well-groomed for serving His purposes over and above my own. To that end, I have been honored among men by the love of my wife Cassandra, the respect of wonderfully adjusted children, and the wealth of dozens of pleasing grandchildren. Cassandra and I have for our help in raising this family the exquisite example of many proud and supportive brothers and sisters, who are likeminded in their understanding of the joy of this great family. Nevertheless, the period of my sabbatical may seem to have been long on neglect for my wife, even more than of my Father's business. To be sure, it is incumbent upon me to fulfill my vows, and to diligently work to remind her of the love that I have for her, which is the main reason that she ever liked me in the first place.

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in this paragraph, I must say a special thank you here to my brothers Harry (who over-helped me launch Bob's Brainfood Barn), George (who let me help him build, and share, the Man Cave), Oliver (who calls me on every Obama success, and to razz George), Claudie, Larry, David, Duane, Tony, Raymond (*r.i.p.*) and Bo (*r.i.p.*). And, to my sisters – Barbara (who financed the Brainfood Barn), Rosie (sweet Jennifer's mom), Millie, DD, Theresa, Janice, Betty (*r.i.p.*), and Lorraine (*r.i.p.*), my success as a father of daughters comes directly from you. Facebook status notwithstanding, I am grateful for the friendship of those daughters – Jennifer, Keisha, Jackie, Melinda, Regina and Ayelle. And I am always encouraged by the pride that I hear from Aaron and the perpetual assistance that is Bob (Brainfood) Jr.

I love you all. Thank You!

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	Nature Lessons in the Family Category of Venue Model Sporting Event coded as Diverse Activity Type 6 - Outings												Nature Lessons in the Lessons Category of Ver Sporting Event coded as Diverse Activity Type											
NSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluste					
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Gir			
VENUE																								
LessonsAP	.043						.078		.056	.063			.046					.078	.068					
CommunityAP						-.083												-.099						
FamilyAP				.062		.088	-.043			.052									-.042					

BNSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluste					
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Gir			
TOTAL																								
TotalAP	.058			.103			.039			.088			.051			.097								
VENUE																								
LessonsAP	.051					.082	.081		.058				.055			.080		.121	.064					
CommunityAP						-.115				.068								-.128						
FamilyAP				.072																				
IMPETUS																								
ExperienceAP		.036	-.036			-.085																		
TrainingAP	.042			.083		.117							.042	.038		.083		.087						
RecreationAP		-.079			-.082		.039	-.094		.095				-.085			-.082		.039	-.094				
INVOLVEMENT																								
ParticipateAP	.040			.061						.087			.046			.073								
ObserveAP	.035	.043		.073		.079												.080						
DENDROGRAM																								
LearningAP	.045						.049			.091			.045						.049					
PlayAP				.065		.119										.074		.083		-.083				

Table 22 – Change in Reading Association Betas by Reassigning Activity

	Nature Lessons in the Family Category of Venue Model Sporting Event coded as Diverse Activity Type 6 - Outings												Nature Lessons in the Lessons Category of Ver Sporting Event coded as Diverse Activity Type											
NSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Clust					
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Gi			
VENUE																								
LessonsAP	0.034		0.048				0.070		0.108				0.045	0.024	0.063				0.069		0.1			
CommunityAP																								
FamilyAP				-0.042	-0.060								-0.026		-0.028	-0.052	-0.064							

BNSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Clust					
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Gi			
TOTAL																								
TotalAP	0.024	0.026					0.053	0.058	0.043				0.025		0.033				0.046	0.038	0.0			
VENUE																								
LessonsAP	0.038	0.030	0.048				0.064		0.091				0.045	0.033	0.059				0.062		0.0			
CommunityAP																								
FamilyAP				-0.037				0.046								-0.042	-0.058							
IMPETUS																								
ExperienceAP													-0.019			-0.035								
TrainingAP	0.028		0.038		-0.050		0.045		0.065	0.061		0.083	0.034		0.038		-0.050		0.045		0.0			
RecreationAP										-0.039		-0.060												
INVOLVEMENT																								
ParticipateAP	0.026	0.024	0.031				0.057	0.036	0.070				0.026	0.024	0.031				0.057	0.045	0.0			
ObserveAP								0.041								-0.038								
DENDROGRAM																								
LearningAP	0.020		0.030		-0.048		0.039		0.052				0.020		0.030		-0.048		0.039		0.0			
PlayAP																								

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variation
BNSAP	Breadth of Non-School Activity Participation
EAP	Extracurricular Activity Participation
ECLS-K	Early Childhood Longitudinal Study – Kindergarten Cohort (began in 1999)
GPA	Grade Point Average
IRT Scale	Item Response Theory scale scoring student assessments using response patterns to estimate of the probability of correct responses if all items were answered.
KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
MOMED	Mother's education level
NCES	National Center for Education Statistics - U.S. Department of Education
NSAP	Non-School Activity Participation
SDQ	Self-description questionnaire consisting of 42 statements wherein children rated their perceptions of their own socioemotional development
SES	Socioeconomic status of a student's family
SESQ	Socioeconomic quintile variable
SPSS	Statistical Package for the Social Sciences
SRS	Social Rating Scale measuring children's approaches to learning, self-control, interpersonal skills, and peer relations.

CHAPTER ONE - INTRODUCTION

Background of the Study

Statement of the Problem

It has long been held that experience is vital for learning (Dewey, 1938). Social interactions are as important as academic contexts for promoting understanding of behaviors and knowledge that indicate appropriate child development (Hickey, 2003). Activity experiences contribute directly to developmental growth and indirectly to scholastic achievement (Marsh, 1992), and, whether participative or observational, these experiences should contribute to a child's understanding of acceptable and expected behaviors. Research shows that, despite an inevitable point of overextension (Cooper, Valentine, Nye, & Lindsay, 1999; Powell, Peet, & Peet, 2002), increasing extracurricular activity involvement has been associated with academic adjustment, psychological competencies, and a positive peer context (Fredricks & Eccles, 2006). In contrast to the Coleman (1961) proclamation that extracurricular activity participation (EAP) detracts from academics, there is a significant body of research reporting positive developmental consequences of EAP. Understudied among this research is pre-adolescent participation in activities (Howie, Lukacs, Pastor, Reuben, & Mendola, 2010). Given that extracurricular activities tend to begin in the middle school years, applying the aforementioned research to elementary students may be possible by a study of non-school activity participation (NSAP).

Research initiatives on facilitating school success argue strongly for the development of pre-academic, social, and behavioral skills early in children's school careers (Pianta & Stuhlman, 2004).

Gumpel (2007) maintained that evolving social behavior skills facilitate individual engagement in social reciprocity, where positive instances improve social competence or status. Moreover, Brophy-Herb Lee, Nievor, and Stollack (2007) reported that links between social skills and academic achievement are reflected in the scholarly literature as well as in policy briefs and practitioner guides. The components of social competence have been found to be influential in positive student functioning (*e.g.* Welsh, Parke, Widaman, & O'Neil, 2001, Linares, Rosbruch, Stern, Edwards, Walker, Abikoff, et. al., 2005) and predictive of academic achievement (*e.g.* Wentzel, 1991; Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000). This research began with an examination of what previous researchers have identified as correlations between social competence and student performance. Thereafter, the research sought to assess the developmental and cognitive gains that attend to the social interactions inherent in non-school activity participation (NSAP). The study conducted a cross-sectional analysis of NSAP by the third grade students, who took part in the Early Childhood Longitudinal Study began in 1999, to confirm the associations with academic performance identified by the EAP research.

It was the hypothesis of the study that non-school activity participation (NSAP) contributes to social competence, vicarious or social learning, and therefore to academic performance. Moore demonstrated in 1998 that peer interactions extend understanding of language and literacy. Recently, Raban and Nolan (2005) reported several ethnographic studies that have identified links between various home experiences and children's early literacy skills. Many library websites post the cliché, "Up until the fourth grade, children learn to read. After that point, children read to learn." Given the importance of literacy, evaluating the impact of activity participation upon student competence, and thereafter upon the outcome measure of reading, should prove beneficial to our understanding of student learning.

Purpose of the Study

The purpose of the study was to confirm prior research findings that social competence has positive associations with academic performance and to assess diverse non-school activity participation (NSAP) and its relationship with third grade student social development and academic performance. The study used data variables from the Early Childhood Longitudinal Study (ECLS-K) to determine if the presence or absence of participation in non-school activities would affect associations with student social competence and academic achievement, as measured by reading performance. The study further sought to determine whether observed associations are sustained over the presence of likely confounding variables (*i.e.* Gender, Race, Mother's Education Level, and SES), as well as when controlling for participation in specific cognitive activities (*e.g.* Reading, Tutoring, Computing, and Library Visits).

Research Hypotheses

The study addressed the following hypotheses:

1. Student social competence is positively related to student reading performance.
2. Third grade non-school activity participation (NSAP) is positively related to student social competence.
3. Third grade NSAP is positively related to third grade reading performance.
4. Third grade breadth of non-school activity participation (BNSAP) has a stronger association with student social competence than NSAP.
5. Third grade BNSAP is more strongly positively related than NSAP to student reading performance.

Definition of Terms

The terms listed below are used throughout this study and are operational for this study as defined here:

Activity Participation Indicator. A dichotomous (0 = no; 1 = yes) indication of participation in an activity.

Aggregate Scoring. A subtotal, or sum of indicators of participation in particular activities. Aggregate scores are obtained for both total and breadth of activity participation.

Breadth of Participation. Activity breadth represents diversity of activity participation. Breadth is distinguished from total participation in aggregate scoring. For example, whereas scouting and 4H/Farm club participation would contribute 2 to the total activity aggregate score, such participation would only increment the breadth aggregate score by 1 as club participation.

Diversity of Activity Participation. Each activity is assigned to a diversity group with activities deemed similar in areas such as content, exposure, or interactivity. Diversity or breadth of participation indicates a count of the diversity groups in which activities were participated.

Extracurricular Activity. School-related activities (*e.g.*, academic clubs, band, chorus, drama club, sport teams, student government, etc.) usually participated in after school hours.

The Metrics of EAP Research. The use of counts/sub-totals of activity participation indicators to analyze associations between student activities and outcome measures.

Non-School Activity. These are activities in which the student participates outside of the school setting. These would include family activities (chores, games, outings, recreation), lessons (art, dance, drama, music), clubs (community, scouting, 4H/Farm), performances, sports, and so forth.

Significance of the Study

Activity participation research has evolved following the premise that activities can be tallied thereby creating an independent variable that can be compared to an outcome measure and give evidence of potential benefit from the participation. The study seeks to answer the question of "Why should a benefit accrue to academic measures from activity participation?" This study bridges this gap in the literature by positing that activity participation will associate positively with both social competence and reading performance.

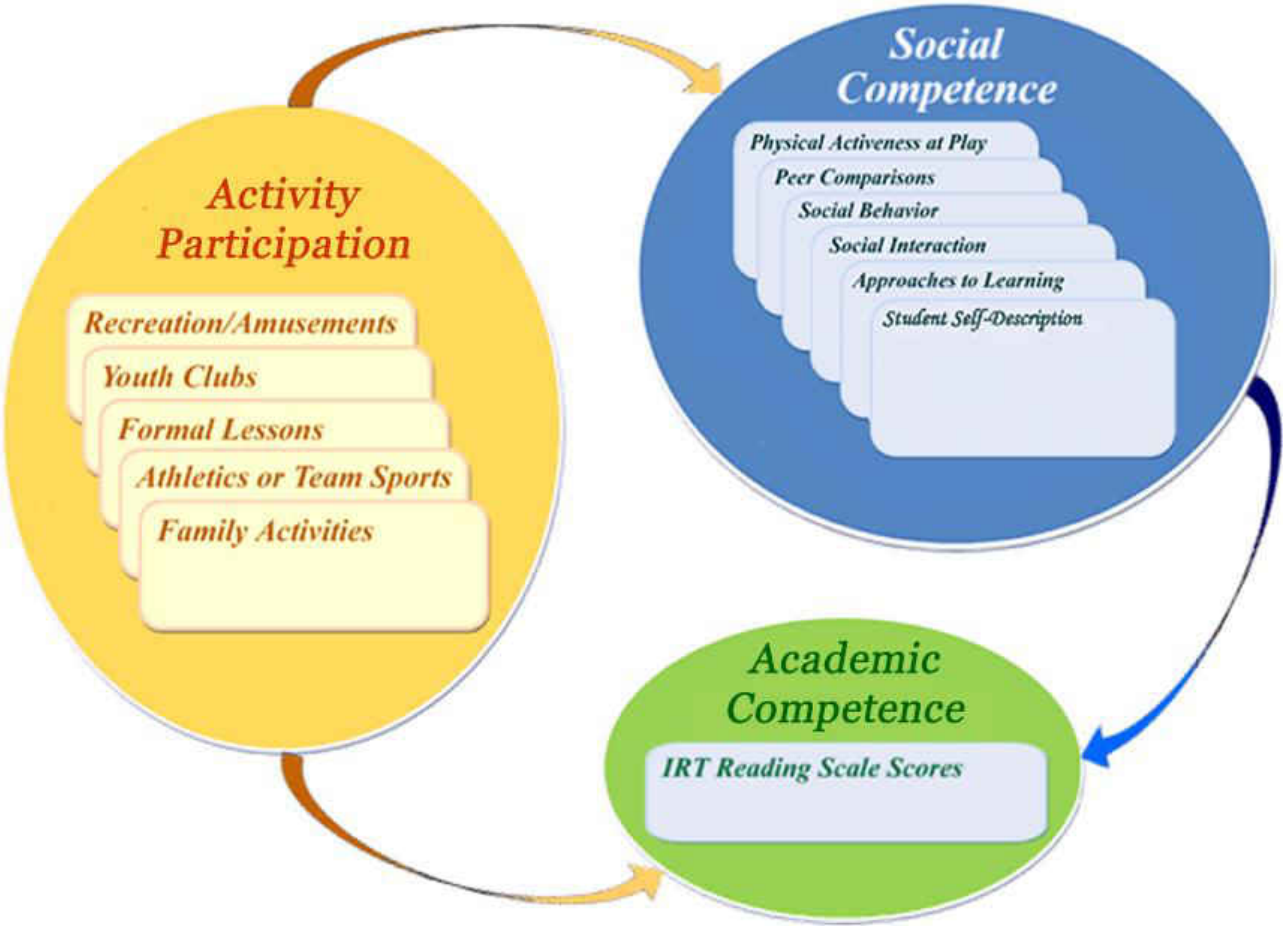


Figure 1: Theoretical Relationships - Non-School Activities, Social Competence, and Student Performance

Empirical data is vital to policy decisions regarding funding of school activities or school relationships with agencies that encourage or empower participation in non-school activities. There is practical significance in such data if particular activities or activity groups (aggregates) can be identified as associating significantly with academic or developmental growth after controlling for the confounding variables (*e.g.* family income, parents' education, race or gender) to which growth is normally ascribed.

Despite recent criticism of the continued viability of the use of count variables within the EAP metric (Roth, Malone, & Brooks-Gunn, 2010), the study design followed the premise that aggregate scoring facilitates analysis of activity participation profiles. Aggregations are devised to reflect differing levels of exposure to various activity groups and the mix of activities in which the student participates. Also, tallies were filtered to score participation in diverse activities. The function of aggregate scoring is not to assess the effect of participation in particular activities. Rather, the search is for associations with types of activities (*e.g.* in-school vs. out-of-school, structured vs. nonstructured, sports vs. the arts).

Significance of the Study for Theory

This study was based on current research regarding participation in extracurricular activities and student achievement. The significance of this study from a theoretical perspective is to identify associations between tallies of non-school activities participation and 3rd Grade measures of student social competence and reading performance. It is believed that social competence bridges the gap in the EAP literature which often touts behavioral gains and suggests academic performance gains from EAP. By examining the connection between the social process of activity participation and indicators of social competence the case for academic performance gains might be strengthened.

It is believed that this study makes several contributions to the activities participation literature. First, by applying the EAP metric to non-school activities, the study extends the methodology into the elementary school and broadens the available data on child development. Second, the study deepens and facilitates the breadth of activity participation line of research by its introduction of coding activity participation indicators for diversity. Third, by using multiple aggregation models, the study provides for simultaneous quantitative analysis of competing justifications for associations between activity participation and the dependent variables. Theoretical stipulations for each of the models were drawn from the literature.

Significance of the Study for Practice

Marsh (1982) was able to interpret his results as holding practical significance for decisions regarding the scaling back of extracurricular activity programs. Similarly, this study sought to provide empirical support for parents and teachers to encourage activity participation that improves the opportunity for students to succeed in their pursuit of learning and developmental growth.

Nature of the Study

This study analyzes a secondary longitudinal dataset. However, this is a cross-sectional study of the 5th round (spring 3rd Grade) of the collected data.

Research Design

The present study design is exploratory and correlational, using a quantitative method of inquiry.

Assumptions

Dichotomous treatment of activity participation assumes that any positive response, relative to an activity, can be regarded as participation. In some instances, responses to alternative activity venues are accepted as alternative indications of participation in a particular activity. Probably the most misunderstood concept of activity participation research is what the count of the activity indicators represent. The count reflects a measure of points of social contact, from which activity participation derives its benefit. The validity of this approach may be tested by systematically removing the effect of following these assumptions from the aggregate scores of activity participation computed for the study.

Scope and Limitations of the Study

As analysis of a secondary dataset, this study is limited to the use of available variables. Accordingly, there is the shortcoming of specific intent in the collection of some responses, and of completeness, as it relates to queries which might otherwise have been expected. The array of activity-related variables is sufficient for this exploratory investigation. However, data collected on the extent of activity participation (*e.g.* hours per week, role of the student, or student feelings towards the activity) may have allowed for generalization.

Organization of the Remainder of the Study

This research is presented in five chapters. Chapter 1 has introduced the study, providing background information and a statement of the problem. The purpose of the study has been presented, along with the rationale and underlying research hypotheses. The operational terms of the study were defined, and a brief overview of the study methodology was given. Also, the significance of the study for theory and practice was posited. The chapter concluded with the

nature of the designed study, assumptions about the data, and the resulting scope and limitations of the research.

Chapter 2 consists of a review of the literature. The chapter reviews two primary veins of research to set the foundation for the dependent and independent variables used in the study. Review of the social competence literature identifies the rating scales and measures in extant research, association with academic performance, and studies which spoke to the impact of participation in activities on developmental growth. Chapter 2 also reviews the history of extracurricular activity participation (EAP) research, its indicators and applied metrics. The chapter also includes a discussion of the criticisms of EAP research and recent approaches to overcome identified shortcomings. Chapter 3 describes the methodology of the study, identifying the source and particulars of the secondary dataset. This chapter presents the calculations used to create alternative baseline academic measures and fully explains the procedures for deriving the social competence composite used as the intermediate dependent variable. Also described is the method used for recoding activity indicators and calculating the aggregate scores that were used as independent variables in the descriptive and inferential statistical analyses which follow. Chapter 4 reports the results of statistical analyses, keyed to the research questions of the study. Finally, Chapter 5 reviews the summarized results, discussing the consistency of the findings with extant research and the limitations of the present inquiry. It also discusses how the results support the research questions, makes conclusions about the success of the study, and offers suggestions for further research on this topic.

CHAPTER TWO - REVIEW OF THE LITERATURE

This review will present the theoretical foundations of an analysis of student activity participation and its relation to student development and performance. Any study of outcomes and student performance must necessarily begin with an inquiry into student capacity or competence. Following a review of social competence literature, a discussion of extracurricular activity participation (EAP) research will ensue. The EAP discussion will highlight the evolving scoring metric used by researchers while addressing the methodological concerns which attend to activity participation research (*e.g.* dichotomous coding, dimensions of EAP analysis, student self-selection, and controlling for confounding variables). Thereafter, research which looks into nonschool activity participation (NSAP) will be briefly considered.

Social Competence Research

In spite of the implications for policymakers and teacher practitioners (Brophy-Herb, Lee, Nievor, & Stollack, 2007), there is no consensus or empirically based definition of social competence accepted by the majority of researchers (Blankemeyer, Flannery, & Vazsonyi, 2002). Often cited is Attili's (1989) general characterization of social competence as the ability to coordinate resources in order to reach adaptive goals. Vaughn, McIntosh, and Hogan (1990) effected this coordination via four components – positive relationships, age-appropriate social knowledge, absence of inappropriate behavior, and presence of appropriate social behavior. However, the components of Caldwell and Pianta's (1991) definition identified four necessary

abilities for assessing competence – effective self-regulation, tension-management, prosocial skills, and social adjustment. LaFreniere and Dumas (1996) seemingly combined these views of the construct, anticipating "behaviors that indicate a well-adjusted [managed], flexible [self-regulated], emotionally mature [appropriate], and generally prosocial [positive] pattern of social adaptation" (p. 373).

Vaughn, Azria, Krzysik, Caya, Bost, Newell, et. al. (2000) argued for a more abstract definition of social competence in terms representing coherence over time, noting that varied definitions were applicable to varied contexts. Although acknowledged by researchers that problem-solving and interpersonal skills facilitated the maintenance of relationships (*see* Rubin & Rose-Krasnor, 1992), a behavioral manifestation of these skills is consistently espoused (Smith & Walden, 2001). Acknowledging the behavioral emphasis of most definitions, Jalongo (2006) argued that social competence also involves cognitive processes. Sheridan and Walker (1999) identified two aspects of children's social skillfulness – to learn a variety of appropriate social skills and to learn to relate to other people in an acceptable way (cited in Junttila, Voeten, Kaukiainen, & Vauras, 2006). Social competence could therefore be construed as a measure of a student's ability to exhibit culturally acceptable cognitive and behavioral responses in varying situations. These responses are most often observed during peer interactions, and further represented by individual student behaviors vis-à-vis the group.

Social Competence Rating Scales and Measures

Researcher assessments of social competence reveal several perspectives. Caldwell and Pianta's (1991) Early School Behavior Scale (ESBS) loaded competency scale items on three factors – frustration tolerance, assertiveness, and task orientation. Similarly, Walker, Irvin, Noell, and Singer (1992) regarded both behavioral and cognitive components in their three dimensions

of social competence – peer-preferred behavior, teacher-preferred behavior, and school adjustment. By these views, negotiating peer group dynamics, meeting teacher behavioral expectations, and academic achievement, attitude, and involvement in school activities contribute to the measure of social competence (Blankemeyer, Flannery, & Vazsonyi, 2002).

Another approach, the School Social Behavior Scale (SSBS) (Merrell & Gimpel, 1998), primarily rates students on the dimensions of prosocial vs. antisocial behaviors. Junttila, Voeten, Kaukiainen, and Vauras (2006) based their Multisource Assessment of Social Competence Scale on the SSBS, identifying the following subdivisions of the prosocial and antisocial behaviors – cooperating skills, empathy, impulsivity, and disruptiveness. However, Bukowski (2003) found that aggressive or coercive behaviors, often termed antisocial, can at times indicate strategies that reflect levels of adjustment and competence equal to that of prosocial children. Likewise, ethologists have argued that in some developmental periods, aggressive behavior, rather than being certain indicators of social incompetence, actually contributes to strategic resolution of conflicts and possibly promotes social competence (Vaughn, Vollenweider, Bost, Azria-Evans, & Snider, 2003). Obravadovic, Van Dulmen, Yates, Carlson, and Egeland (2006) adopted a developmental psychology approach, whereby social competence is assessed by the presence of clinically significant symptoms. Their study took a skill-assets oriented view of competence via social, cognitive, and emotional well-being domains. Gumpel (2007) noted that social competence skills are present even in the student exhibiting behavioral disorders because the discourse in such cases is not about absent or deficient skills, rather unstable performance. The complexity of the components of competence argues that any association between the constructs will be complex and non-linear (Bukowski, 2003).

Social competence has most often been assessed by measures of peer interactions and emotional self-regulation (Raver, Blackburn, & Bancroft, 1999). This behavioral perspective has provided a consistent and convenient measure for statistical analysis, but overlooks the data on cognitive gains that attend to all social interactions. The context of interactions defines social relationships and interpersonal perceptions, and contributes to the development of social judgments (Malloy, Sugarman, Montvilo, & Ben-Zeev, 1995). Children grow in social competence as they receive feedback on the decisions which result from their social reasoning. "Young children's social competence grows and develops when adults support them in social reasoning as they think about other human beings, try out different strategies, arrive at socially acceptable decisions, evaluate outcomes, and try again" (Jalongo, 2006, p. 8). Though initially the majority of accepted and valued feedback comes from adults upon whom children depend, approaching adolescence peer interactions have increasingly more influence. Additionally, activity itself provides content for the development of reasoning strategies, accruing benefits similar to those which result from the parent-child dyadic or other instructive opportunities. Notably, the ECLS-K third grade assessment contained a socioemotional component completed by the children (Third Grade User Manual).

Social Competence and Academic Performance

Wentzel (1991) studied the co-influences of social responsibility, peer relationship, and self-regulatory components of social competence on academic achievement. Each aspect of social competence was found to relate significantly to students' grades. Moreover, findings from multiple regression analyses suggested "socially responsible behavior mediates almost entirely the relationship between GPA, peer status, social responsibility goals, interpersonal trust, and interpersonal problem solving" (p. 1075). The results also indicated that the path to positive

social responsibility may stem from student self-regulatory responses to acceptance or rejection by their peers.

In a longitudinal study by Caprara, Barbaranelli, Pastorelli, Bandura, and Zimbardo (2000) third-grade prosocial behavior robustly predicted eighth-grade academic achievement, even when controlling for prior academic achievement. Counterintuitively, the study also showed that early aggressive behaviors had no predictive value for academic achievement or social preference (for sharing/caring peers). Neither was prior academic achievement a significant predictor of later academic achievement when controlling for early prosocial behaviors. Results underscored what the researchers noted as "an emerging shift in psychology from the prevailing focus upon the impact of negative factors on developmental trajectories toward a focus on the influential role of positive factors in the directions children's lives take. Prosocialness … helps to promote social networks conducive to academic learning" (p. 302).

Welsh, Parke, Widaman, and O'Neil (2001) conducted a longitudinal study of social and academic competence. Sociometric measures by students and teachers were evaluated against grades reported for language and math. The study found that from first to second grade, and from second to third grade, student academic achievement directly influenced social acceptance and behaviors. For students entering the third grade, a reciprocal relationship was found between social and academic competence, in that results also showed a significant path coefficient from positive social competence to academic competence. This was also noteworthy because the coefficient was nearly twice that from academic competence to positive social competence.

It has been consistently believed that improving social competence should improve academic performance. Grant and Haynes, (1995) sought to enhance cultural competence in children by making them other-aware, emphatic and skillful in there interactions as a means of

building social competence. Hoglund and Leadbeater (2004) examined the interactive factors of home, school and classroom and their effect upon children's in-school behaviors. They found that higher classroom concentrations of prosocial behaviors (and interestingly, victimization) predicted increases in social competence. Such results are representative of the impetus for school-wide interventions to promote social competence.

Linares, Rosbruch, Stern, Edwards, Walker, Abikoff, et. al. (2005) tested a social competence strategies intervention, the Unique Minds School Program (UMSP), which targets student cognitive social-emotional (CSE) competencies. UMSP ranks self-efficacious cognitions about learning a valuable component of social competence training and teaches students to select prosocial alternatives to routine classroom challenges. The study compared UMSP students over various levels of exposure to students from a non-participating school. Results noted a significant time effect on downward trajectories in social-emotional functioning in addition to reporting positively affected math grades for program participants.

Rimm-Kaufman and Chiu (2007) conducted an exploratory study on an implementation of the Responsive Classroom (*RC*) Approach. Used by more than 60,000 teachers nation-wide, the RC Approach integrates social and academic learning. The first 3 of the essential principles are 1) equal emphasis on the social and academic curriculum; 2) focus on *how* children learn as much as *what* they learn; and 3) the view that social interaction facilitates cognitive growth. Students of teachers who used more *RC* practices showed greater improvement in reading after controlling for earlier reading performance and family risk. Prior academic or social performance was the strongest predictor of school performance, however, use of the *RC* Approach by teachers contributed positively even after accounting for earlier performance levels.

Social Competence and Activity Research

Of significance to this study, Spencer (1999) demonstrated how diverse experiences influence self-perceptions and attributions during self-discovery. Spencer writes that these encounters influence behavior, aspirations, and emotional responses. Participative activities should contribute to a child's understanding of how to interact in similar future settings. Observational activities should contribute to a child's understanding of what cultural norms are, and what is acceptable behavior. In both activity classes the student is given additional opportunities for vicarious growth by their presence in situations where peers are corrected or applauded. Just as certain behaviors are outgrown over time, certain experiences foster maturity in social competency skills. The ability to behave correctly and to respond appropriately is directly related to experienced situations, especially in the cases where correction and the rationale for corrections are observed. Marsh (1992) concluded that determining whether EAP affects, or is merely correlated with, the dimensions of academic or social self-concept is at the heart of the problem with interpreting the findings of much EAP research.

The context of interactions defines the social relationships and interpersonal perceptions as well as contributes to the development of social judgments (Malloy, Sugarman, Montvilo, & Ben-Zeev, 1995). Children grow in social competence as they receive feedback on the decisions which result from their social reasoning (Jalongo, 2006). Though initially the majority of accepted and valued feedback comes from adults upon whom children depend, approaching adolescence peer interactions have increasingly more influence. Mahoney, Cairns, and Farmer (2003) argue that activities, that are voluntary, structured, and challenging, hold potential for skill building and competence promotion. Again, Hoglund and Leadbeater (2004) found that the interactive factors of home, school and classroom predicted increases in social competence.

Summary of Social Competence Literature

Despite the absence of consensus on a definition of social competence, the recurring elements in the literature all contribute to the facilitation of learning. Successful navigation of the student years (Attili, 1989; Blankemeyer, Flannery, & Vazsonyi, 2002) requires appropriateness (Vaughn, McIntosh, & Hogan, 1990), self-regulation (Caldwell & Pianta, 1991; Raver, Blackburn, & Bancroft, 1999), and prosocial adaptation (LaFreniere & Dumas, 1996). Relationship maintenance (Rubin & Rose-Krasnor, 1992) is a valuable social skill, which is certainly improved by cognitive processes (Jalongo, 2006; Linares, Rosbruch, Stern, Edwards, Walker, Abikoff, et. al., 2005). To be sure, cognitions facilitate task orientation (Caldwell & Pianta, 1991) and school adjustment (Walker, Irvin, Noell, & Singer, 1992). Ultimately, the social judgments (Malloy, Sugarman, Montvilo, & Ben-Zeev, 1995) that children make in their interactions with others (peers and adults) reflect the measure of their social competency,

Social competence is often found to be significantly related to students' grades (*e.g.* Wentzel, 1991; Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000), and in some instances the relationship has been found to be reciprocal (Welsh, Parke, Widaman, & O'Neil, 2001). Accordingly, efforts by researchers to understand and improve social competence have been undertaken (*e.g.* Grant & Haynes, 1995; Hoglund & Leadbeater, 2004). Indeed, some schools have adopted programs aimed at improving social competence levels by integrating social competence skill-building into the curriculum (*e.g.* Linares, Rosbruch, Stern, Edwards, Walker, Abikoff, et. al., 2005; Rimm-Kaufman & Chiu, 2007).

Activity Participation Research

Questioning the value of participation in extracurricular activities has a long history in educational research. Fiscal policymakers are concerned with bottom line results from funding activities (Coladarci & Cobb 1996). However, since the societal objective of our schools tends to alternate between academic knowledge transmission and full development of individual students, the academic or developmental stance of the researcher has influenced data collection and interpretations (Holland & Andre, 1987). The beneficial effects of extracurricular activity participation (EAP) are therefore weighed in the balance of the researcher's frame of reference.

Coleman's (1961) pivotal study on adolescents found that athletes and cheerleaders, rather than academically successful students (scholars), commanded the recognition and respect of their peers. Because of this student emphasis on peer acceptance, Coleman argued that sport EAP subverts involvement in academics. Despite the more positive psychosocial outcomes (Feldman & Matjasko, 2006), the time and energy devoted to sports was determined to be a distraction from, or in competition with, academic pursuits. The Coleman model, termed zero-sum because of its perspective of a singular sum benefit derivable from student use of time, serves as the theoretical basis, if not the contrary base (*see* Marsh, 1992), of the majority of EAP research.

In contrast to Coleman, Marsh (1991) posited a "commitment-to-school" hypothesis where he argued that student engagement and identification with school and school values is enhanced by EAP. In a follow-up study, Marsh (1992) submitted that extracurricular activity could nominally affect academic outcomes while contributing to nonacademic outcomes, or alternatively have positive effects on nonacademic outcomes in addition to facilitating academic growth. This study compared social self-concept as a mediator of negative EAP effects, offered

by the zero-sum model, to academic self-concept as the mediator of positive effects, by the commitment-to-school frame.

Marsh (1992) coded sophomore and senior responses to extracurricular activity queries, then summed the responses to arrive at a total EAP (TEAP) score. Optimally weighted scores, obtained via multiple regressions, were analyzed against the research outcomes. The variance explained by the optimal scores and TEAP scores were nearly the same – supporting the a priori definition of TEAP. Marsh found that although the statistically significant effects of TEAP were typically small, they were consistently positive. However, by continuing the analysis using an intervention perspective, comparing non-participants with moderate EAPs, Marsh was able to interpret the results as holding practical significance for decisions regarding the scaling back of extracurricular activity programs. Marsh's operationalization of TEAP would be instrumental in extracurricular research in the decade to follow.

In 1996, Gerber used the National Education Longitudinal Study (NELS 88) to perform a study of correlations of school related extracurricular activities and those outside the domain of school. Using multiple regression analyses, the degree of participation in these activities was evaluated by race upon measures of academic achievement. After controlling for SES and gender, the study of Grade 8 students found that increased EAP was associated with positive academic achievement for both African-American and White students. Notably, the study also found that school related activities held greater associations than the associations with activities outside the domain of school (*e.g.* summer programs, non-school sports, scouting, youth clubs, religious youth group).

Lisella and Serwatka (1996) used the NELS 88 data to investigate inner-city minority and gender differences in school-sponsored (*i.e.* science fairs, academic clubs, sports/cheerleading,

music/arts, speech/drama, school publications, student council, religious organizations, vocational clubs) vs. community-based (*i.e.* scouting, boys/girls clubs, YMCA, 4-H Club, sports, hobby clubs, summer programs, religious groups) extracurricular activities. Analyses of variance (ANOVA) were run on student self-reported GPA, and standard (reading, math, science, and social science), as well as a composite, achievement test scores. Female activity participant vs. non-participant results were mixed, showing higher achievement by participants in the majority of the instances where significance was noted. For minority male students, significant differences were found in all activities except community sports and religious groups, importantly however, all but one were associated with greater achievement levels for non-participants. In contrast, White males who participated in sports, music or the arts had higher grade averages than non-participants. Noteworthy in their analysis was the question of whether certain activities attract students who are already academically proficient.

Mahoney and Cairns (1997) argued that the influence of extracurricular involvement is not evenly distributed across persons. In their longitudinal study on school dropouts, they posited that interaction between nonacademic extracurricular involvement and risk would reflect greater relationship strength among marginal students than already vested highly competent children (*cf.* Lisella & Serwatka, 1996). Mahoney and Cairns set up their research to be in direct contrast to the *"attractive diversion"* hypothesis – a paraphrase of the Marsh (1992) description of Coleman's (1961) *zero-sum* perspective wherein sports EAP is thought to divert student attention from academics.

In 1999, Eccles and Barber investigated adolescent outcomes associated with activities over five categories – performing arts, academic clubs, team sports, school involvement, and prosocial (*e.g.* church and volunteer). Prosocial activities were found to be protective against

truancy and alcohol/drug use. Participation in performing arts was identified as protective for 12th Grade GPA. Although team sports were protective for grades, the study found that team sports held risk for alcohol/drug use.

Harrison and Narayan (2003) sought to link the participation in sports versus non-sport activities with a sense of belonging and connectedness to explain differences in prosocial and healthy behaviors. The study found similar protections from sports participation as in the research of Eccles and Barber (1999). In addition, Harrison and Narayan noted that students of single parent homes were less likely to participate in activities whereas students of two-parent homes tended towards. liberal participation in activities. Similarly they found that victims of sexual abuse and of substance abusing families specifically avoided school sports, though not group activity in general.

Guest and Schneider (2003) continued the research of Eccles and Barber (1999) on identity and context as they affect outcomes pertaining to athletic extracurricular participation. The study confirmed the association between context and identity, and particularly the consistently positive achievement for non-sports EAP. However, although the association between identifying as athletic and achieving higher grades grew stronger from lower- to middle-class schools (where less than half of the students went on to college), at upper-class schools (where nearly all students went on to college) such identity appeared detrimental to the student portfolio (*i.e.* "distracts students from being future oriented" p. 98; *cf.* Coleman, 1961).

Mahoney (2000) studied the longitudinal effect of EAP on maladjusted behaviors. The study found that effective youth activities were characterized as highly organized or structured, with regular meetings that emphasized increasingly complex skill-building as an activity goal, and competent adult leadership. Mahoney's work in the efficacy of structured activities

continued (in a non-school context) with several associates. In Mahoney and Stattin (2000), the inverse relationship between structured activity participation and antisocial behaviors was confirmed, noting the especially problematic situation for boys when leisure was unstructured and there was an absence of participation in any structured activity. Mahoney, Stattin, and Magnusson (2001) demonstrated by a longitudinal study that periodic or frequent participation in youth centers that lack structured and skill-building activities was associated with high juvenile crime and persistent offending. Mahoney, Stattin, and Lord (2004) found that with the exception of prior antisocial behavior, involvement in unstructured youth recreation centers was the strongest indicator of antisocial behavior. Findings confirm that unstructured environments attract adolescents with preexisting behavior issues, resulting in aggregation of antisocial peers, and an increase in antisocial behavior by its participants. Mahoney, Schweder, and Stattin (2002) found that adolescent depressed mood, heightened by parent–adolescent detachment, was reduced for participants in after-school activities compared to non-participants, and was reduced when students perceived support from a nonrelated after-school activity leader (*i.e.* "competent adult leadership", Mahoney, 2000) compared to those who did not perceive such a relationship.

Bartko and Eccles (2003) used the community-based Maryland Adolescent Development in Context Study (MADICS, 1997) for their longitudinal research into structured vs. unstructured activities (*i.e.* sports, school vs. community clubs, hanging out with friends, reading). Cluster-analytic techniques were used to identify patterns of activity involvement for participation in multiple activities. They argued that broader settings would benefit analysis of teen participation. Interestingly, in Eccles and Barber (1999), coding breadth of activity participation was used (located in a footnote) to facilitate analysis of participation in multiple types of activities (*i.e.* several sports = 1 activity, several clubs = 1 activity). However, in Barber, Stone, and Eccles

(2003), breadth or "eclectic" participation evolved in the design and in the discussion. In 2006, Fredricks and Eccles used breadth of participation to control for self-selection, which Larson (2000) had argued can, of its own, predict positive outcomes and thereby confound interpretation of any analysis of activity participation.

Two projects in recent years have used the same data sample as the present study. Dumais (2006) used the 3rd Grade students from the ECLS-K to study the influence of SES and activity type on changes in reading and math performance and teacher evaluations of students. The research viewed activity participation as cultural capital and investigated activity type distinctions of high arts (music, dance, drama or art lessons) vs. other (sports or clubs) vs. participation in any one of these activities. A 'Yes' response to either the 1st or 3rd Grade query– "Has your child ever ...?" was coded as participation, and kindergarten scores were controlled when predicting the change (from 1st to 3rd Grade) in reading and math scores. The study sought to determine by the interaction effect between SES and activity participation whether academic performance improvements would redound to higher SES students, supporting Bourdieu's (1973) social reproduction model, or to lower SES students, which would support DiMaggio's, (1982) cultural mobility mode. The study found increases in variance explained and therefore modest effects on gains in reading scores with lower SES students showing greater gains than the benefits from activity participation indicated for higher SES students.

The ECLS-K study by Covay and Carbonaro (2010) proffered noncognitive skills (operationalized by the SRS Approaches to Learning variable) as an indirect link between extracurricular activities and academic achievement. The cross-sectional study also used the 3rd Grade students with an emphasis upon investigating the advantage posed by SES. The study controlled for home environment, prior (1st Grade) reading and math scores, and school SES as

measured by students eligible for free lunch. Also, the study used multiple imputation rather than listwise deletion to maintain a large sample size. It should also be pointed out that the researchers limited their activities of interest to six, and specifically decided against the use of a count variable, which they deemed problematic to account for "effects" of different types and the number of activities in the same model. The study found that students who participate in sports benefit more in math achievement than those who participate in other activities. High-SES students were argued to have suffered from an additional vs. compensatory context in regard to decreased scores.

The Metrics of Extracurricular Activity Participation (EAP) Research

The metrics of EAP research have historically revolved around aggregate scoring. From Marsh's (1992) single aggregate TEAP, Figure 2 illustrates the evolution of aggregate scoring models identified by the EAP research reviewed in this section. The most-often used method of scoring participation within the aggregates has been to count relevant activity indicators. By dichotomously coding the indicators, they need only be summed for each participation category.

Arguing against the use of dichotomously coded activities, Roth, Malone, and Brooks-Gunn (2010) excluded studies based upon absolute attendance (yes versus no) in their review of research on afterschool programs and found "a lack of consistent definitions and metrics for measuring participation" (p. 312). Such an aversion to the pervasive use of dichotomous variables in early EAP research is one of the methodological concerns regarding activity participation research which will be discussed below.

Rose-Krasnor, Busseri, Willoughby, and Chalmers (2006) delineated the distinctions between two major dimensions of student activity participation – breadth (*i.e.* the number of

different types of activities) and intensity (*i.e.* the average frequency of involvement). The researchers suggested that breadth of involvement not only expands the opportunities for broadening skill range and values for youth, but exposes the child to varied people and

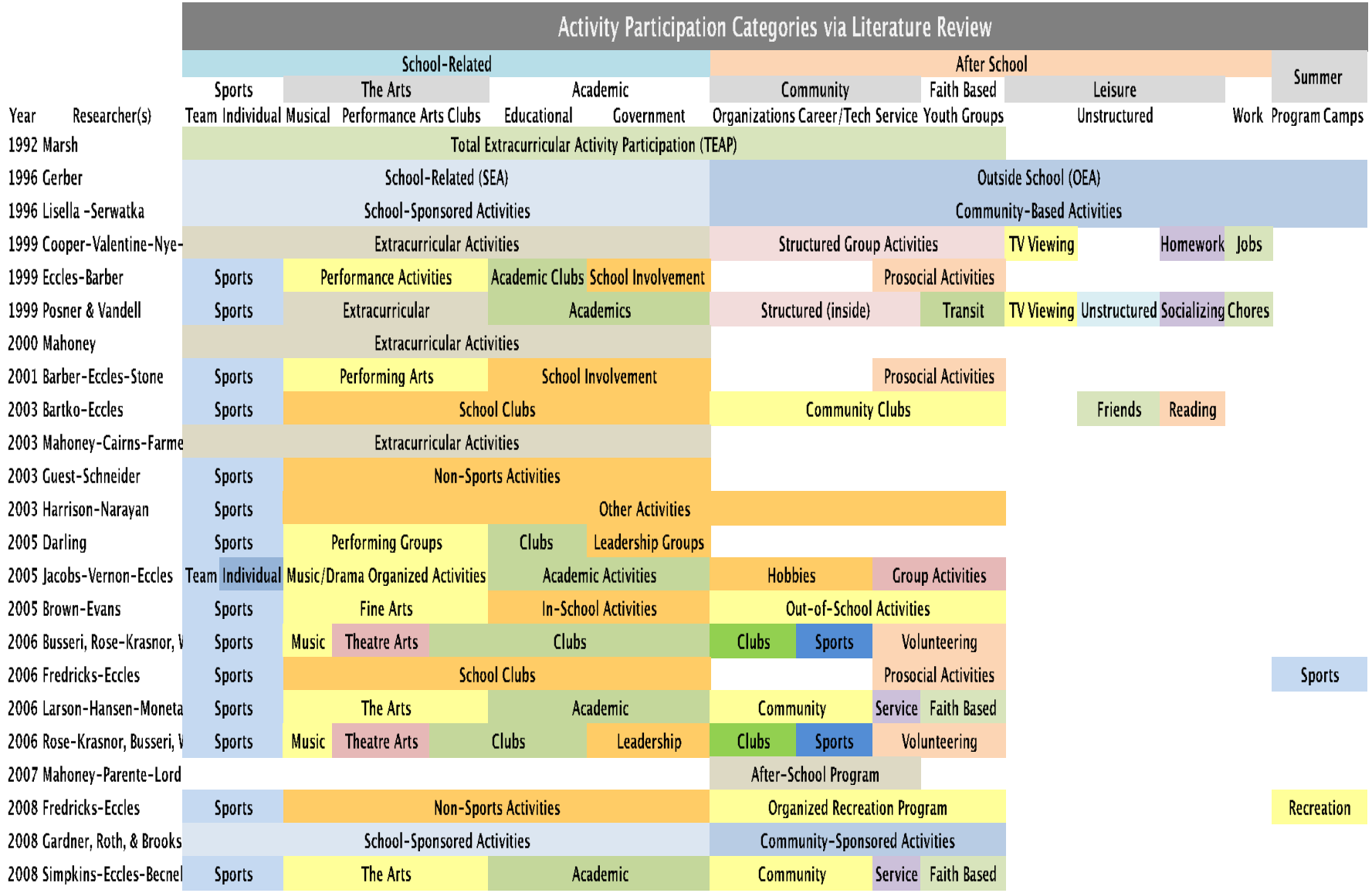


Figure 2: Activity Participation Categories via Literature Review

experiences. The same team of researchers, in Busseri, Rose-Krasnor, Willoughby, and Chalmers (2006), extended their earlier work through a longitudinal analysis of the breadth and intensity relationships between activity involvement and adolescent development.

Simpkins, Eccles, and Becnel (2008) provided further support for evaluating activity breadth over the more historical activity intensity (from tabulated dichotomous participation indicators) in EAP research. In addition to refining their results with activity breadth, or diversity of activity, their study also sought to defeat the self-selection arguments by controlling for activity non-participants and for the separate aggregate score values. Recently, Bohnert, Fredricks, and Randall (2010) offered an insightful review of four dimensions of activity involvement (*i.e.*, breadth, intensity, duration, engagement). They discussed the reasons for measuring breadth of participation, measurement strategies, and the value of breadth of participation analysis for developmental outcomes.

Non-school Activity Participation (NSAP)

In the years since Cremin (1980) suggested a "multiplicity of individuals and institutions that educate" (p.19), there has been increasing research on non-school learning. The origins, historical role and purpose of after-school programs have been to provide opportunities for experimentation and progressive learning experiences that are distinguished from the methods used by the schools (Halpern, 2002). Although the 20th century began with movement towards encouraging participation in clubs and organizations, Coleman (1961) argued that the adolescent culture had elevated the social leaders of these activities, contributing to the devaluation of academics. Even among school sponsored extracurricular activities, those perceived as non-scholastic (*i.e.* not the math club, science club, civics club, etc.) have been traditionally viewed as non-academic.

Fantini and Sinclair (1985) wrote that functional linkages and lines of accountability should be established between school and non-school settings as part of reforms to insure quality and equality of education. Citing historical calls for linkage between educational settings from Dewey, Cremin, and Goodlad, they sought to remind policymakers that schooling, though a major part, does not represent the totality, of education. Halpern (2002) noted a resurgence of after-school programs in the 1990s, due in part to shifting work patterns, diminished social webs and unsafe neighborhoods. Homework help became not only a universal but growing component of these new programs. Halpern argued that narrow instrumental aims, in conjunction with the heightened expectations of program funders, should give us cautious pause regarding the continued effectiveness of these programs.

Cooper, Valentine, Nye, and Lindsay (1999) analyzed student afterschool time spent on homework, in extracurricular activities, in structured groups, watching TV, and at work against three achievement measures. They found time spent on homework and in extracurricular activities positively associated with grades and achievement scores. The relationships between time in structured groups and standardized and achievement test scores were consistently positive. However, they observed a decline in the relationship strength to achievement test scores as students move from middle grades through high-school. They reported that time spent working associated negatively with achievement, prompting them to conclude that the employment identity tends to replace school identities. The relationship between watching television and achievement test scores although negative for White students was interestingly positive for non-White students. It could be argued that although watching TV may "displace schoolwork" (Cooper, Valentine, Nye, & Lindsay, p. 377) for White students, it may actually supplement schoolwork for non-Whites. Although Cooper, Valentine, Nye, and Lindsay showed

a positive direct correlation between EAP and achievement test scores, they also report a dramatic drop in achievement test scores at the highest levels of student activity time participation.

In one of the few elementary student activity participation studies, Powell, Peet, and Peet (2002) found that non-school activity participation of 1st Grade children was positively related to academic performance at low to moderate participation rates. However, the intensity relationship was curvilinear in that from moderate to high participation, the relationship to school grades was negative. Interestingly, breadth of involvement in this study was measured like TEAP (*i.e.* total number of out-of-school activities), and was not related to school grades.

Mahoney and Stattin (2000) conducted a study of Swedish youths involved in highly structured community activities versus those whose primary leisure time was spent in generally unstructured youth recreation centers (YRCs). They found that structured activities were linked to low antisocial behavior while unstructured activity participation was linked to higher incidents of antisocial behavior. For boys, involvement in only an unstructured activity was strongly associated with high antisocial behavior. In a later study, Mahoney, Stattin, and Magnusson (2001) demonstrated that frequency of participation in the YRCs was strongly related to age at first arrest.

Pugh and Bergin (2005) reported that despite a growing body of research in out-of-school learning contexts, there is little study on the transfer of academic interest between learning environments, whether in-school or out-of-school. They argued that at least some learning activities should provoke students unto self-directed learning. Fashola (2003) explored activities where academics may or may not have been primary or secondary goals of the programs that he reviewed.

Methodological Concerns of Activity Participation Research

A few of the issues within activity participation research require particular attention beyond the historical review of the literature. First, the dichotomization of activity participation indicators has been problematic for some reviewers and researchers. Second, some researchers have argued that student self-selection has a greater influence on participation counts than acknowledged by the proponents of EAP research. Third, breadth of participation has been put forward as one way to enhance the dimensionality of EAP investigations.

Activity Participation Indicators

The method of scoring the activities within the aggregates has been to count the relevant activity indicators. By dichotomously coding these indicators, they need only be summed for each participation category. This is not dichotomous coding via a median split for the purpose of partitioning a scale variable. MacCallum, Zhang, Preacher, and Rucker (2002) make an excellent case for the mathematical and statistical ills of dichotomization. Dichotomization by a median split alters the nature of individual differences, causes a loss of effect size in the population with a corresponding expected loss in the sample, and can affect the outcome of tests of statistical significance. The arguments are all against using the dichotomous variable in the statistical procedures. EAP research uses the sum of the dichotomous activity indicators as a count variable in the statistical procedures. The count variable is the second of the two rare cases discussed by MacCallum, Zhang, Preacher, and Rucker, wherein dichotomization may be justified. Here, they note that dichotomization of a measured variable yields a dichotomous status indicator, which could be useful for subsequent analyses.

The use of the count variable as an aggregate score is still inadequate to the challenges regarding assessing the full relationship between participation and outcomes (Roth, Malone, &

Brooks-Gunn, 2010). It has been conceded that not all extracurricular involvement is equal and that detailed information about participation is desirable (Barber, Stone, & Eccles, 2003). However, findings from count variables in Barber, Stone, and Eccles demonstrated that being in more than one activity is related to better outcomes than being in only one, which is better than being in none. Similarly, from the breadth of participation inquiry, eclectic participation was related to better outcomes than participation in only one domain, which was better than nonparticipation. Although the present study does not seek to assess the full relationship between participation and outcomes, Eccles (2005) points out that the next generation of EAP studies will need to focus more upon specifics. However, Eccles also calls for studies which seek to identify the differential benefits associated with different varieties of activities studied on different varieties of students. It is in the design of such studies that the count study remains a necessary prerequisite, for in the execution of such quantitative analysis the selection of variables and aggregates can be refined.

Student Self-Selection in Activity Participation

Larson's (2000) discussion of self-selection actually spoke to one of the earlier criticisms of EAP research. Self-selection argues that capable students pursue activities. Thus, it is not participation that predicts capabilities, but the other way around. Gardner, Roth, and Brooks-Gunn (2008) wrote that "self-selection … remains an obstacle to definitive conclusions about the causal role of participation in organized activities" (p. 815). Fredricks and Eccles (2008) point out that since reported participation in extracurricular activities tends to be the choice of White, higher SES, students, and SES and race are the stronger predictors of academic adjustment, the benefit of EAP is arguably overstated in much of the extant literature. Detecting the impetus for activity participation, whether the proclivity or interest of the child (Posner & Vandell, 1999) or

the skill set or competency the child brings to the activity (Lisella & Serwatka, 1996), complicates resolution of the self-selection issue.

In 2006, Fredricks and Eccles adjusted for self-selection by including multiple measures of the dependent variable, controlling for some participation influencer variables (*e.g.* parents' educational attainment, parents' perceptions of children's achievement-related motivation, and the prior outcome level), and including a motivation control because highly motivated youths tend to both do well in school and engage in extracurricular activities. Darling (2005) suggested using within-person variations in a longitudinal study to control for between-person participation differentials. Although Darling's cross sectional analysis revealed strong selection effects by gender, age, and ethnicity, her longitudinal analyses decreased the magnitude of the differences, and thereby reaffirmed the positive influences of EAP after controlling for the associations attributable to selection. Larson, who with Hansen and Moneta (2006) developed a Youth Activity Inventory to evaluate student ratings of the developmental prospects of various activities, also used within-person comparison to control for self-selection.

Breadth of Activity Participation

As mentioned above several teams of researchers (Eccles & Barber, 1999, Fredricks & Eccles, 2006, Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006, Simpkins, Eccles, & Becnel, 2008) have provided direction in the development of breadth of participation analysis. Bohnert, Fredricks, and Randall (2010) offered best practices for the assessment of activity indices – Their recommended assessment strategies for the breadth of participation study are as follows:

1) Assess total number of different activity contexts participated in (*i.e.*, group activities by predetermined categories and then sum the number of categories satisfied)

2) Use dispersion methods
    a. proportion variables = activities by category / total number of activities
    b. homogeneity index = sum the squared proportion variables (*see* Jacobs, Vernon, & Eccles, 2005)
3) Use cluster analytic approaches to identify profiles of participation
    a. Cluster analysis allows for simultaneously examining a number of activity settings (Bartko & Eccles, 2003). ANCOVA analyses of identified clusters reveal differential patterns of relations with psychosocial measures, while controlling for demographics such as gender, race or SES.

Summary of Activity Participation Literature

Extracurricular activity participation (EAP) research has historically been a risk-benefit analysis. Coleman's (1961) assertion that the academic purpose of our schools was placed at-risk by the childish friendship preference for jocks over scholars lay dormant for three decades before Marsh (1991) countered with the argument that both schools and academics benefit by having committed students. Marsh (1992) offered empirical support by introducing total extracurricular activity participation (TEAP) as a measure of summed responses by sophomore and senior students on their participation in extracurricular activities. Other researchers begin to report small but significant positive associations between EAP and academic achievement (*e.g.* Gerber, 1996; Lisella & Serwatka, 1996; Eccles & Barber, 1999, Harrison & Gopalakrishnan, 2003), though in some instances it was lack of participation that signaled achievement (*see* Lisella & Serwatka, 1996; Guest & Schneider, 2003).

The focus of EAP research shifted from TEAP associations to activity characteristics (*i.e.* structured vs. unstructured, *e.g.* Mahoney, 2000; Mahoney & Stattin, 2000; Bartko & Eccles,

2003) and activity aggregations (Eccles & Barber, 1999; Barber, Eccles, & Stone, 2001). Also, to address the issue of student differences (Mahoney & Cairns, 1997), student demographic and participation profiles (Posner & Vandell, 1999; Larson, Hansen, & Moneta, 2000; Darling, 2005) began to be factored into EAP research. The ECLS-K data was used by researchers to examine activity participation interactions between academic performance gains and SES (Dumais, 2006) and between noncognitive skills and academic achievement (Covay & Carbonaro, 2010). However, persistent doubts relating to student self-selection (Gardner, Roth, & Brooks-Gunn, 2008) prompted further methodological changes (Darling, 2005). TEAP has evolved from a singularly dichotomous construct to one that is multidimensional, with research now considering breadth (or diversity) of activity involvement, participation intensity, longitudinal duration, and level of engagement.

Demographics of Academic Performance

Despite a national concern for improved academic performance by our elementary students, the average reading scores of 4th Grade students show no measurable improvement from the 2007 assessments (Aud, Hussar, Planty, Snyder, Bianco, Fox, et. al., 2010). Accordingly, the 26 point achievement gap between 4th Grade White and Black students, though smaller than any assessed in the years between 1992 and 2005, is no longer narrowing. The gap between average White and Hispanic reading scores remains in 2009 at the 25 points assessed in 1992. On the positive side, the Condition of Education 2010 report noted continued narrowing of the 20+ point math achievement gaps that exist between White and Hispanic students, and between White and Black students. Despite the glaring differences in student performance indicated by racial averages, the predictor of the greatest statistical strength is invariably the

socioeconomic status (SES) of the student's family. And, although studies implying class distinctions remain taboo (Farnen, 2007; *cf.* Bourdieu, 1973), the search for mediators of student performance is vital to the facilitation of equal opportunity in child development.

Chapter Summary

The need to analyze the associations between activities and social competence cannot be overstated. This is evidenced by the recurring relationship highlighted in the EAP research between EAP and behaviors. The benefits to be gained by an investigation into the associations between non-school activities, social competence and academic performance are several. The activities that one participates in or observes, constitute the foundation for, or at a minimum serves as a substantial contributor to, one's capacity for learning. Non-school activities take place in venues for coconstructive reasoning. The potential exists for not only identifying activities that prove positive despite the controls usually credited, but for adding to the literature an understanding of student performance that is specifically associated with activity participation.

Few EAP studies have been found which undertake this investigation (*cf.* Tudge, 2003 on preschool; Dumais, 2006 and Covay & Carbonaro, 2010 on 3rd Grade students; Mahoney, Parente, & Lord, 2007, and Shernoff, 2010 on after-school programs). Spencer (1999) demonstrated how diverse experiences influence student behavior, aspirations, and emotional responses. The study of activity engaged in during the human experience can also provide evidence regarding the various venues to knowledge outcomes as a result of interaction through attendance, involvement, or active participation. Such empirical analysis can also instruct the inclusion of future variables in the proliferation of longitudinal databases now being funded. The

emerging methods for controlling self-selection and considering activity breadth speak to the vitality of EAP research, whatever the state of the social rhetoric regarding the academic or developmental purpose of our schools. By applying the metrics of EAP to elementary student data, including several methodological enhancements discussed in the next chapter, this research will add to the literature an understanding of student performance that is specifically associated with activity participation.

CHAPTER THREE - METHODOLOGY

Introduction

This research sought to confirm prior research findings of associations between student social competence and academic performance. Second, using the constructed social competence composite, the study examined the relationship between elementary student participation in non-school activities and their social competence or reading performance measures. Third, the study investigated the association strength of the non-school activity participation scores. Finally, alternatively aggregated scores were analyzed to determine if breadth of participation analysis would yield stronger associations than the total participation aggregations.

Research

The design of the present study will be exploratory and correlational, using a quantitative method of inquiry.

Research Hypotheses

The study will test the following research hypotheses:

1. Student social competence (as measured by Teacher, Parent, and Student sub-scales composites) relates positively to student academic performance outcome (measured by Reading IRT scale score).
2. Third grade non-school activity participation (NSAP) associates positively with student social competence composites.

3. Third grade NSAP associates positively with academic performance, as measured by Reading IRT scale score.
4. Breadth of non-school activity participation (BNSAP) associates positively with student social competence composites, and, the strength of the association will be greater than that which exists between social competence and NSAP.
5. BNSAP associates positively with academic performance, as measured by Reading IRT scale score, and, the strength of the association will be greater than that which exists between reading and NSAP.

For hypothesis 1, social rating scale, peer comparison and student self-description variables were factor analyzed then by algorithm used to construct social competence composites for the following sub-scales: Teacher, Parent, and Student. The sub-scale composites were indexed and combined into a full-scale composite. The 3rd Grade Reading IRT scale scores were regressed on the full- and sub-scale composites for analysis of the associations. In addition, several baseline reading measures (*i.e.* reading change, percent change, and change percentile) were generated, using the 1st Grade Reading IRT scale scores, for use in testing later hypotheses. For the remaining hypotheses, various aggregations of non-school activity participation indicators were tallied to generate NSAP totals and BNSAP summaries. The NSAP totals will serve as independent variables for testing hypotheses 2 and 3, wherein respective regressions of social competence composites and the various student reading performance measures were analyzed. Similarly, hypotheses 4 and 5 were tested by regressing social competence composites on BNSAP and thereafter regressing the various student reading performance measures on BNSAP.

Research Questions

The study was guided by the following five research questions:

1. Is there a relationship between student social competence and reading performance?
2. Does a positive association exist between non-school activity participation (NSAP) and student social competence?
3. Does a positive association exist between NSAP and reading performance?
4. Do breadth of non-school activity participation (BNSAP) summaries associate more strongly with student social competence than the NSAP totals do?
5. Do BNSAP summaries associate more strongly with reading performance than the NSAP totals do?

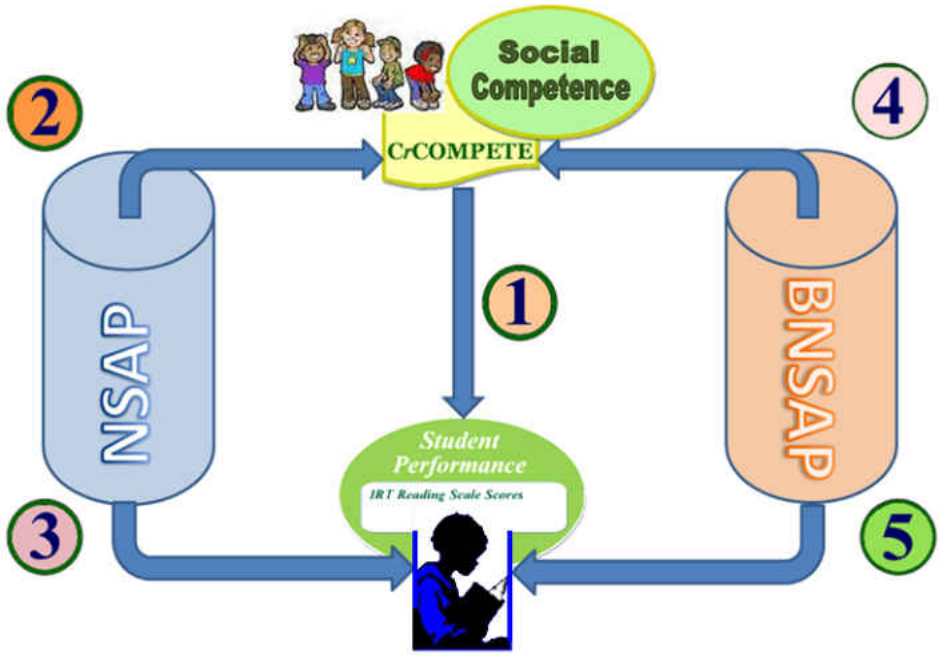


Figure 3: Relationship of Research Questions

Data Source

This study was conducted using a secondary dataset.

Early Childhood Longitudinal Study (ECLS-K)

The Early Childhood Longitudinal Study - Kindergarten Cohort (ECLS-K) was developed under the sponsorship of the U.S. Department of Education, National Center for Education Statistics (NCES). ECLS-K provides descriptive information on children's status at entry to school, their transition into school, and their progression through 8th Grade. The ECLS-K, base year public-use data file for kindergarten class of 1998-99 through the 8th Grade was released in 2010. For the present study, the 5th round of data (spring 3rd Grade) is of primary concern.

ECLS-K – Measures & Instruments

The design of the ECLS-K provides data collected not only from the child, but also his/her parents/guardians, teachers, and school administrators. Repeated measures of student cognitive skills and knowledge were taken over two rounds of data in the kindergarten base-year in fall and spring (1998-99). Summer related data was collected in a third round in the fall of first grade (1999). Subsequently three more rounds of data became available from data collections in the spring semesters of first grade (2000), third grade (2002), and fifth grade (2004). The ECLS-K provides for analysis of a rich data set of variables related to student readiness, performance, and cognitive and academic growth.

Over the six rounds, through computer-assisted telephone interviews, parents/guardians were asked repeating questions at varying intervals on the child's physical functioning and home activities. Parents were also asked questions from a social rating scale (SRS) which reflected frequency of student exhibitions of certain social skills and behaviors. Teacher questionnaires were self-administered each round as well. In addition to the social rating scale (SRS) part of the

teacher questionnaire, there is a part on class and classroom characteristics and a third part with items on organization, activities, methods, teacher views, and school environment and climate.

Additionally, direct cognitive reading assessments were administered in every round to assess children's academic achievement, and to provide a means of measuring reading growth. The assessments used adaptive tests with multiple test forms of varying difficulties to maximize measurement accuracy. The tests were individually administered by computer-assisted trained assessors who first obtained a routing score for a content area then administered a follow-up test as determined by the routing score. The reading assessments provide an overall indicator of children's reading knowledge and skills that, over time, note proficiency and the ability to contextualize, make inferences, extrapolate, and evaluate text (Walston, Rathbun, & Germino Hausken, 2008).

ECLS-K – Data Sample

The ECLS-K included 22,782 children from 944 United States kindergarten programs. The sampling design was dual-frame (public vs. private schools) and multi-staged (23 students from 100 selected county / county group schools), and includes an oversampling of Asian/Pacific Islanders, private kindergartens, and private kindergarten students (Walston, Rathbun, & Germino Hausken, 2008). The original sample was freshened in the first grade data collection to include first grade students who had not attended a United States kindergarten. Therefore, the ECLS-K population is a nationally representative sample of nearly 4 million children who attended United States schools either in kindergarten of the 1998-99 school year or first grade in the 1999-2000 school year (Walston, Rathbun, & Germino Hausken, 2008). All students who continued enrollment at the same school were recontacted from year to year. However, students who changed schools during the study were subsampled in grades 1, 3, and 5.

Because of complex sampling design and the presence of oversampling both at the school and at the case level, NCES has provided weights "to compensate for unequal probabilities of selection and to adjust for the effects of school, child, teacher, and parent nonresponse" (Princiotta, Flanagan, & Germino Hausken, 2006, p. A-4). First stage primary sampling units (PSU) represent 100 counties and county groups, and have weights equal to the inverse of the probability of selecting the PSU. At the second stage, the base weight for the school is the PSU weight multiplied by the inverse of the probability of selecting the school. The base weights for eligible schools are adjusted separately for public and private schools, for nonresponse. Round specific cross-sectional child and parent weights are included in the ECLS-K database to accommodate stages of base year sampling, differential nonresponses, and diverse survey instruments (Tourangeau, Lê, & Nord, 2005).

Variables of Interest

Although theory may guide the choice of a secondary dataset, the variables available for study will certainly inform the structure of the model selected, and the model selected will govern the specific variables to be used in the research. Lomax (2001) warns that the balance between minimizing the number of predictors and maximizing predictive power via R^2 is the researcher's responsibility. A weak model of few variables could yield the same unimpressive adjusted R^2 as an ostensibly strong model with too many variables.

Figure 4 illustrates a methodological concept map of the ECLS-K variables used by this study and their preparation and flow to the statistical procedures used to analyze the relationship between non-school activities, social competence and student performance. Teachers, students, and parents provided responses that seed the social competence data. Parent-answered items

were the source not only for identifying activity participation, but also for information on demographics, professional diagnoses, and cognitive activities used by the study as control variables. Reading IRT scale scores were determined from direct assessments of the student, and the ECLS-K administrators provided distribution weights for managing the complex data sample.

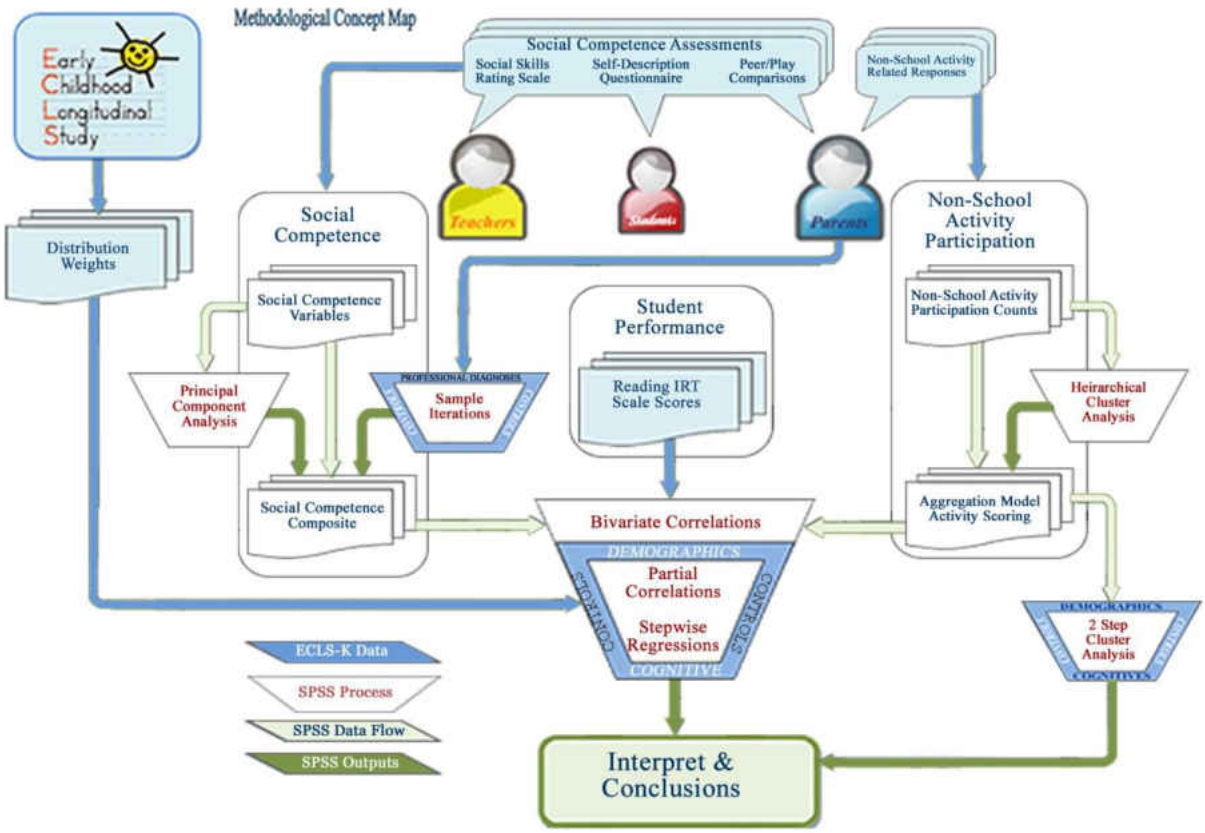


Figure 4: Concept Map of the Data Flow between ECLS variables and Statistical Processes

Principal component analysis will strengthen construction of the social competence composite. Hierarchical cluster analysis of the NSAP indicators informs the aggregation model categories. And, two-step cluster analysis of the NSAP aggregate scores will offer support to interpretations of the descriptive, correlation, and inferential statistics identified by this study.

Reading IRT Scale Scores

The 3rd Grade reading IRT scale score variable C5R3RSCL represented 14,177 student cases with scores ranging from 45 to 179. IRT procedures use the student's response success pattern by level of item difficulty, skipped question profiles, and likely guessed answers to score a student over the complete assessment. By estimating correct responses for the student over all items, the IRT scale scores for each round are calculated as if the student had faced every item. This not only provides a consistent measure of competency for all students assessed in the round, but allows for the gain from round to round to be calculated by simply subtracting the previous round's score. Additionally, the spring 1st Grade reading IRT scale score variable C4R3RSCL was used as a baseline to control for prior reading performance.

Social Competence Variables

Parents, in the earlier rounds, and teachers in each round, completed the Social Rating Scale (SRS). They were asked to assess the student's approach to learning. Parents were also asked questions on the child's social interaction and self-control. Correspondingly, teachers evaluated self-control and interpersonal skills. In the 3rd and 5th Grade rounds there was a measure which allowed the teachers to jointly assess self-control and interpersonal skills. Also asked in every round were questions regarding students externalizing and internalizing problem behaviors. Parents answered similar behavior questions in the first 3 rounds regarding whether their child was impulsive or overactive, and the extent to which the child was inclined to be sad or lonely. It should be noted that only teachers completed the SRS in the 3rd Grade, and their responses to the 28 items were factored into the six scale variables which appear in Table 1.

Table 1 – ECLS-K Variables Used to Construct Social Competence Composites

SOCIAL COMPETENCY	ECLS-K Variable Name	ECLS-K RESPONSE Stem	Code
Parent Responses			
Peer Comparisons			
Child as Good as Same-Age Children	P5SAMEAG	BETTER THAN OTHER CHILDREN	1
Child as Attentive as Same-Age Children	P5ATTENI	AS WELL AS OTHER CHILDREN	2
Child as Clever as Same-Age Children	P5SOLVE	SLIGHTLY LESS WELL	3
Child as Articulate as Same-Age Children	P5PRONOU	MUCH LESS WELL THAN OTHERS	4
Child Behaves as Well as Same-Age Child	P5BEHAVE		
Child as Active as Same-Age Children	P5ACTIVE	LESS ACTIVE THAN OTHERS	1
		ABOUT AS ACTIVE	2
		SLIGHTLY MORE ACTIVE	3
		LOT MORE ACTIVE THAN OTHER	4
Structured/Unstructured Play Comparisons			
During Structured Activities	P5STRUCT	MORE PHYSICALLY ACTIVE	1
		LESS PHYSICALLY ACTIVE	2
Physically Active Free-Time	P5PHYACT	ABOUT THE SAME AS OTHER	3
Teacher Responses			
Social Rating Scale (SRS)			
Approaches to Learning	T5LEARN	28 items factored into six scales	
Self-Control	T5CONTRO	NEVER exhibits this behavior	1.00
Interpersonal	T5INTERP	SOMETIMES exhibits this behavior	-
Externalizing Problem Behaviors	T5EXTERN	OFTEN exhibits this behavior	4.00
Internalizing Problem Behaviors	T5INTERN	VERY OFTEN exhibits this behavior	
Combo of Self-Control & Interpersonal	T5SCINT		
Student Responses			
Self-Description Questionnaire (SDQ)			
SDQ Reading scale	C5SDQRDC	42 items factored into six scales	
SDQ Mathematics scale	C5SDQMTC	NOT AT ALL TRUE	1.00
SDQ School scale	C5SDQSBC	A LITTLE BIT TRUE	-
SDQ Peer scale	C5SDQPRC	MOSTLY TRUE	4.00
SDQ Anger/Distractibility scale	C5SDQEXT	VERY TRUE	
SDQ Sad/Lonely/Anxious scale	C5SDQINT		

Parents were asked a series of peer comparison questions: whether their child was as good as other children about the same age, behaved as well as children their age, was as attentive, as active, or as articulate as their peers. Note that the ECLS-K variable name (P5PRONOU) indicates that the "as articulate" question drew upon the child's ability to

pronounce words. Likewise, the variable name (P5SOLVE) for the question which had asked if the child was "as clever as" their peers hints at the child's problem solving abilities.

Finally, parents were asked in the spring of Kindergarten, and the 3rd and 5th Grade to rate how active their child was during physically active free time and during structured activities. Although similar questions were asked of teachers as to how active the student was relative to other students during structured and unstructured play, these variables were not included in the public-use data set, and are therefore not included in this study.

In the spring semesters of the 3rd and 5th Grade, students completed a self-description questionnaire (SDQ) consisting of 42 statements regarding how they felt about themselves both socially and academically. To compensate for differences in student reading levels, trained ECLS-K assessors conducted a paced administration of the SDQ, by reading the SDQ questions to all students and deliberately not looking at the student answer sheets. Student responses were factored into six scale variables.

The parent peer comparisons of their child and structured/unstructured play comparisons, the teacher social rating scale (SRS) skills evaluations and the student self-description questionnaire (SDQ) provide ample data for constructing composite sub-scales. Having assessments from different sources contribute to consistency and reliability more than by using any of the measures alone (Cooper, Valentine, Nye, & Lindsay, 1999).

Students Receiving Professional Diagnoses

The study considered responses by parents regarding learning, speech, hearing, or vision concerns. These variables provided indication of professional diagnoses of learning, speech, hearing or vision problems or difficulties. It was believed that these variables might help to

identify outliers when constructing social competence composites. The particular inquiries were prefaced as follows:

"Did you obtain a diagnosis of a problem from a professional?"

The following are the ECLS-K variables and the number of cases with YES responses:

P5DIAGNO (Learning problem diagnosed)	875
P5COMMU2 (Speech problem diagnosed)	351
P5DIFFH3 (Hearing difficulty diagnosed)	49
P5VISIO2 (Vision difficulty diagnosed)	2,365.

Non-School Activity Variables

Non-school activity variables considered for inclusion in the model had been measured in at least three waves of ECLS-K data collection. The presumption was that parents would have more familiarity with the particular query and the responses would be more consistent, and therefore reliable. Responses to the questions were coded in either of two types as shown in Table 2.

Table 2 – ECLS-K Activity Variable Encoding

Response Type	Encoding
Yes/No	1 = Yes
	2 = No
perWeek	1 = NOT AT ALL
	2 = 1 - 2 / Wk
	3 = 3 - 6 / Wk
	4 = EVERYDAY

Thirty variables qualified, and are listed on the next page in Table 3.

Table 3 – ECLS-K Non-School Activity Variables

ECLS-K Variable Description	ECLS-K Variable Name	Response Type*
Typical Family Week		
In a typical week, how often do you or any other family member with {CHILD}?:		
HOW OFTEN YOU ALL SING SONGS	*P5SINGSO*	perWeek
HOW OFTEN YOU ALL PLAY GAMES	*P5GAMES*	perWeek
HOW OFTEN YOU ALL DO SPORTS	*P5SPORT*	perWeek
HOW OFTEN YOU HELP CHD DO ART	*P5HELPAR*	perWeek
HOW OFTEN YOU TEACH CHD NATURE	*P5NATURE*	perWeek
HOW OFTEN CHILD DOES CHORES	*P5CHORES*	perWeek
BUILD SOMETHING OR PLAY WITH CONSTRUCTION TOYS	*P5BUILD*	perWeek
Recent Outing		
In the past month has anyone in your family done the following things with {CHILD}?		
VISITED A ZOO, AQUARIUM	*P5ZOO*	Yes/No
CHILD VISITED MUSEUMS	*P5MUSEUM*	Yes/No
GONE TO A PLAY, CONCERT, SHOWS	*P5CONCRT*	Yes/No
ATTENDED (NON-PARTICP) SPORTING EVENT	*P5SPTEVT*	Yes/No
Outside of school hours		
Outside of school hours, has {CHILD} ever		
TAKES ART LESSONS	*P5ARTCRF*	Yes/No
TAKES DANCE LESSONS	*P5DANCE*	Yes/No
TAKES MUSIC LESSONS	*P5MUSIC*	Yes/No
PARTCIPATED IN ORGANIZED PERFORMING	*P5ORGANZ*	Yes/No
PARTCP IN ORGANIZED ATHLETIC EVENTS	*P5ATHLET*	Yes/No
PARTICP IN ORGANIZED CLUBS	*P5CLUB*	Yes/No
Exercise		
[In the last 12 months, did {CHILD} regularly get exercise through any of the following organizations?]		
EXERCISE-SCOUTS/DAISIES	*P5CUBSCT*	Yes/No
EXERCISE-4H/FARM CLUBS	*P5FRMCLB*	Yes/No
EXERCISE-PUBLIC PARK/REC CTR	*P5PUBPRK*	Yes/No
EXERCISE-PLACE OF WORSHIP	*P5CHURCH*	Yes/No
EXERCISE-YMCA/OTHER ORG	*P5YMCA*	Yes/No
EXERCISE-HEALTH CLUB	*P5HLTHCL*	Yes/No
EXERCISE-SPORTS TEAM/LEAGUE	*P5SPTEAM*	Yes/No
Physical Activity		
What types of exercise or physical activity did {CHILD} get at the places you just mentioned?		
GROUP SPORTS	*P5TYPAC1*	Yes/No
INDIVIDUAL SPORTS	*P5TYPAC2*	Yes/No
DANCE	*P5TYPAC3*	Yes/No
RECREATIONAL SPORTS	*P5TYPAC4*	Yes/No
MARTIAL ARTS	*P5TYPAC5*	Yes/No
PLAYGROUND ACTIVITIES	*P5TYPAC6*	Yes/No

* see Table 2

Control Variables

Cognitive Activity Control Variables

Some activity variables, deemed cognitive, were excluded from the activity participation indicator and scoring scenarios for NSAP and BNSAP. These selected ECLS activity variables (listed in Table 4) were used as cognitive controls to mediate confounding variable concerns.

Table 4 – ECLS-K Cognitive Activity Variables

ECLS-K Variable	Description	Case Percentage	Code	Response
P5READBO	How often read to	22.10%	1	Not at ALL
		29.10%	2	1 - 2 perWeek
		24.40%	3	3 - 6 perWeek
		23.50%	4	EveryDay
P5LIBRAR	Visited library	55.40%	1	Yes
		43.70%	2	No
P5HOMECM	Used computer 1-2/Week	79.20%	1	Yes
		19.90%	2	No
P5TUTRDG	Tutored regularly in Reading	9.90%	1	Yes
		90.10%	2;-1	No/not applicable
P5TUTMTH	Tutored regularly in Math	7.10%	1	Yes
		92.90%	2;-1	No/not applicable
P5TUTSCI	Tutored regularly in Science	1.10%	1	Yes
		98.90%	2;-1	No/not applicable

Demographic Control Variables

Because of the preponderance of evidence where certain demographic variables are significant contributors to changes in academic performance, the statistical procedures run on the composites and derived variables of this study will control for these variables to inform the analyses of any discovered variances. Additionally, these controls were included as categorical variables in Two-Step Cluster Analyses to illuminate the natural groupings of activity participation clusters, particularly as aligned with the above controls. Distribution statistics for the ECLS-K demographic variables selected for use in the study are shown in Table 5.

Table 5 – ECLS-K Demographic Variables

Description	ECLS-K Variable	Case Percent	Code	Response
Child Composite Gender				
	GENDER	51.20%	1	Male
		48.80%	2	Female
Child Composite Race				
	RACE	56.30%	1	White, Non-Hispanic
		14.20%	2	Black or African American
		8.50%	3	Hispanic, Race Specified
		8.90%	4	Hispanic, Not Specified
		6.30%	5	Asian
		1.10%	6	Native Hawaiian, Other
		1.80%	7	American Indian or Alaska Native
		2.60%	8	More than one race, Non-Hispanic
Mother's Education Level				
	WKMOMED	4.40%	1	8^{th} Grade or Below
		8.60%	2	9^{th} – 12^{th} Grade
		28.40%	3	HS Diploma / Equivalent
		5.10%	4	Vocational / Technical Program
		25.10%	5	Some College
		14.90%	6	Bachelor's Degree
		1.80%	7	Graduate / Professional School NO Degree
		4.20%	8	Master's Degree (MA, MS)
		1.60%	9	Doctorate or Professional Degree
Categorical SES Quintile Measure				
	WKSESQ5	17.30%	1	First Quintile
		18.20%	2	Second Quintile
		19.00%	3	Third Quintile
		19.90%	4	Fourth Quintile
		21.10%	5	Fifth Quintile

Distribution Weights

Additionally, to take advantage of the study's use of the ECLS-K complex sample design, that contains oversampling, all analyses were conducted applying replicate weight C45CW0 to accurate reflect population estimates when using variables from round 4 (spring 1^{st} Grade) and round 5 (spring 3^{rd} Grade).

Data Analysis

The study prepared these variables and analyzed the data according to Figure 5 (*below*).

Process	Variables								Output	Ch.	Discussion
	Professional Diagnoses	Social Competence		Reading	Model Category Activity		Controls				
		Variables	Composite		Indicators	Scores	Demographic	Cognitive			
Performance Variable Recoding				**PerfVar/Comp**							
Descriptives - Explore				IRT Scale					Stem Leaf / Boxplots	3	Remove Outliers
Frequencies				IRT Scale => ReadingPct					Percentiles	3	Alternative Performance Grouping Variable
Social Competence Recoding		ECLS								3	
Factor Analysis	17 ITERATIONS	ECLS →	Summed Factored						Rotated Component Matrix	3	Factor-Weighted Composite Construction
Descriptive Statistics			Indexed						(Composite-Minimum)/Range	3	Mixed Measure Composite Construction
Case/Composite Selection			**Factor - Summed**	**PerfVar/Comp**							
Activity Variable Recoding					ECLS	by Model Category					
Heirarchical Cluster Analysis					ECLS				Dendogram	3	Model Justification
Heirarchical Cluster Analysis						by Model Category			Dendogram	3	Scoring Justification
Control Variables Recoding							SES-MomEd Race-Gender	ReadTo/Library Computer/Tutor		3	Clustering rationale

Descriptive Statistics						by Model Category			Skewness & Kurtosis	4	
Scale Analysis		**Components**							Cronbach's Alpha	4	Reliability
Bivariate Correlations		**Components**	**Factor - Summed**	**PerfVar/Comp**							
Scale Analysis						by Model Category			Cronbach's Alpha	4	Reliability
Bivariate Correlations			**Factor - Summed**	**PerfVar/Comp**		by Model Category				4	
Partial Correlations						by Model Category	SES-MomEd Race-Gender			4	
Linear Regression			**Factor - Summed**	←	←	by Model Category				4	Predictive Potential
Multi-Regression			**Factor - Summed**	←	←	by Model Category	SES-MomEd Race-Gender		**r^2 Change**	4	Predictive Power
Linear Regression				**PerfVar/Comp**	←	by Model Category				4	Predictive Potential
Multi-Regression				**PerfVar/Comp**	←	by Model Category	SES-MomEd Race-Gender		**r^2 Change**	4	Predictive Power

TwoStep Cluster						by Model Category	SES-MomEd Race-Gender		Within Cluster Percentage Within Cluster Variation Clusterwise Importance	4	Activity Participation Demographics
Partial Correlations						Activity/Breadth	SES-MomEd Race-Gender			4	Extent that independent and control variables predict student performance measures
Linear Regressions						Activity/Breadth	← SES-MomEd Gender		**Standardized Beta Coefficients**		

Figure 5: Variable Preparation, Procedures and Analysis Map

Figure 5 is presented in two sections which correspond to the chapters in this paper wherein the processes are discussed. The shaded cells of the top section represent the point where the dependent and independent variables of the study are first operationalized. Thus, by the end of Chapter 3, all of these variables will have been fully prepared. The lower section represents the procedures which are necessary to authenticate the relationship of these variables as appropriate for answering the questions of this research. All of the processes of the section will have been executed prior to Chapter 4, wherein results are discussed detailing links to the study's main hypotheses.

Preparation of the Research Variables

Data preparation for the study began with evaluating the performance variable, the Reading IRT Scale Score (C5R3RSCL), to identify outliers for determining the base sample population. Thereafter, composites were constructed for intermediate dependent variable, social competence. Full- and sub-scale social competence composites were created by simple variable sums, factor loadings, and indexing, then iteratively for every combination of professionally diagnosed students. The sample and composite having the strongest association with the reading performance variable were used in all subsequent analyses for this research. The ECLS activity variables were recoded, classified via cluster analysis, and scored for each category of the three derived models. Finally, demographic control variables were recoded, as appropriate, and a cognitive control composite was constructed.

Reading – Primary Outcome Variable

The variables for the 1st Grade (C4R3RSCL) and 3rd Grade (C5R3RSCL) spring reading IRT scale scores, like all ECLS-K variables used in the study, were recoded to change all negative codes (*i.e.* -1 NOT APPLICABLE, -7 REFUSED, -8 DON'T KNOW, & -9 NOT ASCERTAINED) to system-missing. This not only assured the list-wise deletion of these cases, but avoided skewing

the descriptive statistics for the variable. Additionally, the spring 1st Grade reading IRT scale score was used as a baseline variable in constructing three alternative dependent variable measures of reading performance improvement. First, CREADCHG was calculated as the difference between the spring 1st Grade (C4R3RSCL) and spring 3rd Grade (C5R3RSCL) reading IRT scale scores:

$$\text{CREADCHG} = \text{C5R3RSCL} - \text{C4R3RSCL} \tag{5.1}$$

The second baseline variable (CREADPCT) was calculated as the percent in reading improvement from spring 1st Grade to spring 3rd Grade:

$$\text{CREADPCT} = ((\text{CREADCHG} / \text{C4R3RSCL}) * 100) \tag{5.2}$$

Finally, cut points (Table 6) were determined for 10 equal groups using the CREADPCT variable. Then, an ordinal variable (CREADPCL) was coded with values 1 to 10 to represent reading improvement percentiles.

Table 6 – Reading Change Percentiles from 1st to 3rd Grade IRT Scale Scores

Percentiles	Cut Points
10	31.28324
20	41.46498
30	50.50075
40	58.27260
50	66.28971
60	75.02326
70	84.41456
80	97.10794
90	116.41406

These reading improvement variables were used as alternative dependent measures to control for prior reading achievement and to inform the interpretations of the associations found between social competence and activity participation (*see* Covay & Carbonaro, 2010).

Social Competence Composites

Composite variables combine the information from several variables into an index. Often constructed as a scale variable, the composite meets the underlying data requirements of many statistical analyses. Moreover, managing variable relationships, analysis and reporting through the use of composites reduce the number of variables and increase the power of the analyses (Burgess, 2004). The composite variable as a weighted combination will ostensibly have a higher correlation with the criterion variable than any of its contributing predictors (Guarino, 2004).

Social Competence Variable Recoding

In constructing a social competence composite it is important that the direction of the coded variables be consistent with the hypothesized direction of the relationships being investigated. In the present study it is hypothesized that social competence is directly proportional to student reading performance. In addition, it is posited that both NSAP and BNSAP will be in direct proportion to social competence. Higher reading scores are clearly preferred, and in this study NSAP and BNSAP are competing to more positively associate with higher social competence. As such, the component variables should be incorporated in such a way as to drive up the composite score.

A quick review of the social competence variable encoding from Table 7 illustrates that as the ECLS-K code for peer comparison variables other than P5ACTIVE increases, the social competence value of the response decreases (*i.e.* the codes ascend from over-performing to under-performing – an inverse relationship). These variables were likely candidates for reverse coding. The P5ACTIVE codes increase as the child is more active, however active by this measure cannot necessarily be deemed a good thing (*e.g.* a sedate child could be either aloof or attentive, a hyper child could be either enthusiastic or inattentive). Likewise, the algorithms which scaled the SRS and SDQ factors are dependent on the orientation of the items upon which they rely.

Table 7 – ECLS-K Social Competence Variables Item Responses

Variable	ECLS-K Code	Response
Peer Comparison other than P5ACTIVE	1	BETTER THAN OTHER CHILDRN
	2	AS WELL AS OTHER CHILDREN
	3	SLIGHTLY LESS WELL
	4	MUCH LESS WELL THAN OTHERS
Peer Comparison -P5ACTIVE	1	LESS ACTIVE THAN OTHERS
	2	ABOUT AS ACTIVE
	3	SLIGHTLY MORE ACTIVE
	4	LOT MORE ACTIVE THAN OTHER
Structured/Unstructured Play	1	MORE PHYSICALLY ACTIVE
	2	LESS PHYSICALLY ACTIVE
	3	ABOUT THE SAME AS OTHER

The structured/unstructured play variables are more problematic. Here, the codes do not simply ascend or descend by level of physical activeness, rather ascending response codes go from high to low to moderate. Also, it could be argued that structured play might command self-restraint whereas unstructured play is one of the few times that a child can explore his/her adeptness with their physical limitations. The ramifications for a composite are unclear.

By running bivariate correlations between the social competence variable and the reading IRT scale scores, more information was brought to bear on the recoding decision. The correlation results appear in APPENDIX B. Suffice it to say here that all of the peer comparison variables had negative correlations (-.106, -.216. -.390, -.324, -.153, -.057; $p < .001$) and were reverse coded for use in composite construction. The externalizing and internalizing behavior variables of both the SRS and SDQ scales also had negative correlations (SRS: -.222, -.229; SDQ: -.302, -417; $p < .001$). Contrary to expectations, the structured play variable, recoded to value more physical activity, outperformed the original variable and the one recoded to value descending physical activity. Equally confusing, the physically active free-time variable, recoded to value less physical activity, outperformed the original variable and the one recoded to value more physical activity. These

variables were recoded accordingly. Finally, math and peer scales from the SDQ were slightly negative (-.076 and -.035), but because these were derived scales with modest correlations as compared to variables discussed above, the variables were not recoded.

Social Competence Composite Construction

The construction of social competence composite is driven by the characteristics of the ECLS-K variables. First, the data was obtained from three different respondents (child, parent and teacher). This argues for creation of sub-scale composites. Second, the parent responses are held in continuous variables, while the child and teacher variables are factored scales from larger arrays of survey items. The mixed measures of the variables make a simple summed full-scale composite problematic. Finally, not only are there mixed measures, there are varied ranges (maximum values) for some of the variables. Even if all of the variables were scored the same, it is not likely that their relative contribution to social competence should be construed as equivalent.

It is believed that all of the above concerns can be resolved by applying factor analysis to the construction of the sub-scales, then indexing the sub-scale composites so that they might be combined (summed) into a single full-scale composite. Seifu (2009) developed a composite measure using factor analysis with principal factors method. However, it appears that factor analysis was used there to discard less relevant variables. In the present research, factor loadings from principal component analysis of the social competence variables were used to provide for weighted variable contributions within each component that are then extended via the components contribution to the explained variance to create a variable multiplier to derive the variable's relevance within the composite. The equations followed in the factored composite process are presented with detailed explanations in APPENDIX A.

After creating sub-scale composites for each group of respondent variables the sub-scale composites are converted to indexes which can then be summed to create a full-scale composite. This is accomplished by running descriptive statistics for the sub-scale composite (C_{ss}), then applying the following formula using the minimum (m) and range (r) to calculate the index (I):

$$Iss = \left(\frac{(Css - m)}{r}\right) * 100 \tag{5.3}$$

To validate the effectiveness of this approach to composite construction, the results of creating composites via this procedure were compared to several alternatives. Factored sub-scale composites were created for the parent (PF), teacher (TF) and child (CF) variables. Also, since the child and teacher variables are of the same measure, they were combined to produce a student factored (SF) composite. Applying Equation 5.3 to the above composites yielded the necessary indexes (PI, TI, CI, and SI) for constructing the other sub-scale composites. A home indexed (HI) sub-scale composite was created by adding the parent and child indexes: HI = PI + CI. An adult indexed (AI) sub-scale of the parent and teacher data is calculated: AI = PI + TI. Although the full-scale (FI) social competence indexed composite could have been calculated using the student and parent index (*i.e.* FI = SI + PI), it was decided to combine the three sub-scale indexes instead, so FI = PI + CI + TI. As an added control, a mixed-measure unscaled factored (UF) composite was included in the composite array. Finally, for every created factored or indexed composite a summed composite of the corresponding variables was created. Thus, 16 composite alternatives (shown in Figure 6) were created to test the validity of the approach.

Child Variable Sub-Scale	
Factored (CF)	Summed (CS)

Parent Variable Sub-Scale	
Factored (PF)	Summed (PS)

Teacher Variable Sub-Scale	
Factored (TF)	Summed (TS)

Student (Child/Teacher) Sub-Scale	
Factored (SF)	Summed (SS)

Home (Child/Parent) Sub-Scale	
Indexed (HI)	Summed (HS)

Adult (Parent/Teacher) Sub-Scale	
Indexed (AI)	Summed (AS)

Indexed Full-Scale Composite	
Indexed (FI)	Summed (FS)

UnScaled Composite	
Factored (UF)	Summed (US)

Figure 6: Factored or indexed sub-scale and full-scale composites

The array of alternative composites was to confirm or enhance understanding of the composite used in the final analysis. The final composite should improve the robustness of later analysis. Ultimately, the selected social competence composite was determined by its degree of correlation with student reading IRT scale scores.

Impact of Professional Diagnoses on Case Selection

It was believed that the presence of a professional diagnosis might confound the ability of the social competence variables to yield a representative composite. The concern was that students identified as having learning, speech, hearing or vision problems or difficulties might have issues that would justify their exclusion from the study. Therefore, determination of the optimal case selection criteria resulted from iterative executions of constructing social competence composites. The sample was varied for each construction initially selecting all cases (*i.e.* ignoring the diagnosis variables), then excluding cases based upon specific combinations of diagnoses, and finally excluding all of the students who had received any professional diagnosis. Figure 7 shows the resulting correlations from 17 iterations of creating the 16 composites of Figure 6.

	READING	Child Variable Sub-Scale			Parent Variable Sub-Scale			Teacher Variable Sub-Scale			Indexed Full-Scale Composite		
	N	Factored (CF)	Summed (CS)	N	Factored (PF)	Summed (PS)	N	Factored (TF)	Summed (TS)	N	Factored (IF)	Summed (IS)	N
01 IGNORE DIAGNOSES (ALL CASES)	14177	.273**	.224**	14163	.270**	.323**	12172	.332**	.340**	11165	.415**	.413**	9716
02 EXCLUDE ANY DIAGNOSIS	9504	.278**	.230**	9498	.220**	.278**	9243	.307**	.316**	7557	.398**	.395**	7374
03 EXCLUDE 1 Diag (Learning) Only	11933	.271**	.223**	11921	.254**	.307**	11649	.319**	.328**	9499	.408**	.405**	9295
04 EXCLUDE 1 Diag (Speech) Only	12316	.274**	.227**	12303	.269**	.320**	12031	.327**	.335**	9810	.415**	.413**	9604
05 EXCLUDE 1 Diag (Hearing) Only	12451	.272**	.225**	12438	.270**	.323**	12165	.327**	.335**	9918	.415**	.413**	9711
06 EXCLUDE 1 Diag (Vision) Only	10443	.275**	.228**	10433	.268**	.320**	10175	.320**	.328**	8300	.412**	.411**	8112
07 EXCLUDE 2 Diags (Learning & Speech)	12386	.273**	.227**	12374	.260**	.316**	12101	.326**	.333**	9872	.413**	.411**	9665
08 EXCLUDE 2 Diags (Learning & Hearing)	12457	.272**	.225**	12444	.270**	.323**	12171	.327**	.335**	9922	.415**	.413**	9715
09 EXCLUDE 2 Diags (Speech & Hearing)	12446	.273**	.225**	12433	.270**	.322**	12160	.327**	.335**	9912	.415**	.413**	9705
10 EXCLUDE 2 Diags (Learning & Vision)	12343	.274**	.226**	12331	.269**	.321**	12057	.327**	.335**	9834	.416**	.413**	9628
11 EXCLUDE 2 Diags (Speech & Vision)	12423	.272**	.224**	12410	.270**	.323**	12139	.328**	.336**	9896	.415**	.413**	9689
12 EXCLUDE 2 Diags (Hearing & Vision)	12454	.272**	.225**	12441	.270**	.323**	12168	.327**	.335**	9920	.415**	.413**	9713
13 EXCLUDE 3 Diags (All but Vision)	12451	.272**	.225**	12438	.269**	.322**	12165	.327**	.335**	9916	.415**	.412**	9709
14 EXCLUDE 3 Diags (All but Hearing)	12443	.273**	.225**	12431	.267**	.321**	12157	.326**	.334**	9912	.414**	.412**	9705
15 EXCLUDE 3 Diags (All but Speech)	12458	.272**	.225**	12445	.270**	.323**	12172	.327**	.335**	9923	.415**	.413**	9716
16 EXCLUDE 3 Diags (All but Learning)	12458	.272**	.225**	12445	.270**	.323**	12172	.327**	.335**	9923	.415**	.413**	9716
17 EXCLUDE ALL 4 DIAGNOSES	12454	.272**	.225**	12441	.269**	.322**	12169	.327**	.335**	9922	.415**	.412**	9715

	READING	Student (Child/Teacher) Sub-Scale			Home (Child/Parent) Index-Scale			Adult (Parent/Teacher) Index-Scale			Unscaled Composite		
	N	Factored (SF)	Summed (SS)	N	Factored (HF)	Summed (HS)	N	Factored (AF)	Summed (AS)	N	Factored (UF)	Summed (US)	N
01 IGNORE DIAGNOSES (ALL CASES)	14177	.379**	.411**	9722	.379**	.411**	9722	.379**	.411**	9722	.411**	.420**	9716
02 EXCLUDE ANY DIAGNOSIS	9504	.349**	.383**	7376	.349**	.383**	7376	.349**	.383**	7376	.392**	.402**	7374
03 EXCLUDE 1 Diag (Learning) Only	11933	.368**	.402**	9300	.370**	.402**	9300	.370**	.402**	9300	.404**	.412**	9295
04 EXCLUDE 1 Diag (Speech) Only	12316	.379**	.410**	9610	.379**	.410**	9610	.379**	.410**	9610	.411**	.420**	9604
05 EXCLUDE 1 Diag (Hearing) Only	12451	.379**	.411**	9717	.379**	.411**	9717	.379**	.411**	9717	.411**	.420**	9711
06 EXCLUDE 1 Diag (Vision) Only	10443	.372**	.404**	8116	.372**	.404**	8116	.372**	.404**	8116	.407**	.418**	8112
07 EXCLUDE 2 Diags (Learning & Speech)	12386	.375**	.408**	9671	.375**	.408**	9671	.375**	.408**	9671	.408**	.418**	9665
08 EXCLUDE 2 Diags (Learning & Hearing)	12457	.379**	.411**	9721	.379**	.411**	9721	.379**	.411**	9721	.411**	.420**	9715
09 EXCLUDE 2 Diags (Speech & Hearing)	12446	.379**	.411**	9711	.379**	.411**	9711	.379**	.411**	9711	.411**	.420**	9705
10 EXCLUDE 2 Diags (Learning & Vision)	12343	.379**	.410**	9633	.379**	.410**	9633	.379**	.410**	9633	.411**	.420**	9628
11 EXCLUDE 2 Diags (Speech & Vision)	12423	.380**	.411**	9695	.380**	.411**	9695	.380**	.411**	9695	.411**	.420**	9689
12 EXCLUDE 2 Diags (Hearing & Vision)	12454	.379**	.411**	9719	.379**	.411**	9719	.379**	.411**	9719	.411**	.420**	9713
13 EXCLUDE 3 Diags (All but Vision)	12451	.379**	.410**	9715	.379**	.410**	9715	.379**	.410**	9715	.410**	.420**	9709
14 EXCLUDE 3 Diags (All but Hearing)	12443	.378**	.409**	9711	.378**	.409**	9711	.378**	.409**	9711	.409**	.419**	9705
15 EXCLUDE 3 Diags (All but Speech)	12458	.379**	.411**	9722	.379**	.411**	9722	.379**	.411**	9722	.411**	.420**	9716
16 EXCLUDE 3 Diags (All but Learning)	12458	.379**	.411**	9722	.379**	.411**	9722	.379**	.411**	9722	.411**	.420**	9716
17 EXCLUDE ALL 4 DIAGNOSES	12454	.379**	.410**	9721	.379**	.410**	9721	.379**	.410**	9721	.410**	.420**	9715

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 7: Reading Correlations with Social Competence Composites via Professional Diagnoses

Although the highest correlation overall appears under the unscaled summed column it has been pointed out that simple sums do not account for the relative contribution of various elements of social competence, and in the present case the variables are of mixed measures. Because of these issues, the unscaled composites were created only for comparison. It should be pointed out that in every case, except for the indexed full-scale composites, the summed composite outperforms the factored or indexed one. This could also be interpreted as indicating that composites constructed via simple sums may overstate associations having distorted the relationship of the elemental variables. To the extent that the indexed full-scale composite functioned as expected, it was selected for use through the later processes of this research. A composite which appropriately includes all of the available variables should better represent the construct under investigation than any combination of less than all of the sub-scales.

Activity – Primary Predictor Variable

Applying the metrics of EAP to NSAP is at the heart of this research. The EAP metric refers to the derivation of the predictor variables. The steps used to establish the NSAP and BNSAP predictors for this research were as follows: 1) assign the variable sub-groups for which activity indicators were set; 2) assign diversity codes to the sub-groups for distinguishing BNSAP; 3) run a hierarchical cluster analysis on the activity indicators to inform the aggregation models; 4) assign the sub-groups to a category in each of the proposed models; 5) score the model categories for NSAP and BNSAP. The model category aggregate scores are thereafter the independent variables for all subsequent analyses.

The non-school activity variables of Table 3 have been organized by activity group and sub-group and presented in Table 8. Derivation of the breadth of participation diversity group codes and the aggregate scoring model category assignments that are identified in the table will be explained below.

Table 8 – Non-school Activity Variable Sources and Classifications

Activity Group / Sub-Group / ECLS-K Variable Description	ECLS-K Variable Name	Response Type*	(Breadth) Diversity Code	Aggregate Scoring Model Category		
				Venue	Impetus	Involve
ART						
Museums						
Child visited museums	*P5MUSEUM*	Yes/No	Outing	Fam	Exp	Obsv
Arts or Crafts Activities						
HOW OFTEN YOU HELP CHD DO ART	*P5HELPAR*	perWeek	Arts	Fam	Trn	Part
Arts or Crafts Lessons						
Outside of school hours - TAKES ART LESSONS	*P5ARTCRF*	Yes/No	Arts	Less	Trn	Part
CHORES						
Regular Chores						
HOW OFTEN CHILD DOES CHORES	*P5CHORES*	perWeek	Work	Fam	Exp	Part
Build Things						
In a typical week, how often do you or any other family member with {CHILD}?:						
Build something or play with construction toys	*P5BUILD*	perWeek	Work	Fam	Trn	Part
CONCERTS, PLAYS, SHOWS						
Plays, Concert, Shows						
[In the past month, has anyone in family & CHILD						
GONE TO A PLAY, CONCERT, SHOWS	*P5CONCRT*	Yes/No	Outing	Fam	Exp	Obsv
DANCE						
Dance Activities						
What types of exercise or physical activity did {CHILD} get at the places?						
DANCE	*P5TYPAC3*	Yes/No	Dance	Com	Rec	Part
Dance Lessons						
Outside of school hours, has {CHILD} ever						
TAKES DANCE LESSONS	*P5DANCE*	Yes/No	Dance	Less	Trn	Part

* see Table 2

Activity Group / Sub-Group / ECLS-K Variable Description	ECLS-K Variable Name	Response Type*	(Breadth) Diversity Code	Aggregate Scoring Model Category		
				Venue	Impetus	Involve
DRAMA						
Organized Performing						
Outside of school hours, has{CHILD} ever participated in: Organized performing arts programs, *e.g.* children's choirs, dance programs, or theater performances?						
PARTCIPATED IN ORGANIZED PERFORMING	*P5ORGANZ*	Yes/No	Dance	Less	Trn	Part
MUSIC						
Family Sing						
HOW OFTEN YOU ALL SING SONGS	*P5SINGSO*	perWeek	Music	Fam	Rec	Part
Music Lessons						
Outside of school hours, has {CHILD} ever participated in: Music lessons, for example, piano, instrumental music or singing lessons?						
TAKES MUSIC LESSONS	*P5MUSIC*	Yes/No	Music	Less	Trn	Part
CLUBS / GROUPS						
Organized Clubs						
Outside of school hours, has {CHILD} ever participated in:						
PARTICP IN ORGANIZED CLUBS	*P5CLUB*	Yes/No	Clubs	Com	Exp	Part
Scouts/Daisies						
[In the last 12 months, did {CHILD} regularly get exercise through any of the following organizations?]						
EXERCISE-SCOUTS/DAISIES	*P5CUBSCT*	Yes/No	Clubs	Com	Exp	Part
4H/Farm Clubs						
[In the last 12 months, did {CHILD} regularly get exercise through any of the following organizations?]						
EXERCISE-4H/FARM CLUBS	*P5FRMCLB*	Yes/No	Clubs	Com	Exp	Part

* see Table 2

Activity Group Sub-Group ECLS-K Variable Description	ECLS-K Variable Name	Response Type*	(Breadth) Diversity Code	Aggregate Scoring Model Category Venue	 Impetus	 Involve
NATURE						
Visited Zoo or Aquarium						
In the past month, that is, since {MONTH} {DAY}, has anyone in your family done the following things with {CHILD}?						
VISITED A ZOO, AQUARIUM	*P5ZOO*	Yes/No	Nature	Fam	Exp	Obsv
Nature Lessons						
HOW OFTEN YOU TEACH CHD NATURE	*P5NATURE*	perWeek	Nature	Less	Trn	Part
PLAY						
Family Games						
HOW OFTEN YOU ALL PLAY GAMES	*P5GAMES*	perWeek	Play	Fam	Rec	Part
Playground Activities						
What types of exercise or physical activity did {CHILD} get at the places you just mentioned?						
PLAYGROUND ACTIVITIES	*P5TYPAC6*	Yes/No	Play	Com	Rec	Part
SPORTS						
Family Sports						
HOW OFTEN YOU ALL DO SPORTS	*P5SPORT*	perWeek	Sports	Fam	Rec	Part
Sporting Event						
In the past month, that is, since {MONTH} {DAY}, has anyone in your family attended an athletic or sporting event with {CHILD} in which {CHILD} is not a player?						
ATTENDED SPORTING EVENT	*P5SPTEVT*	Yes/No	Outing	Fam	Exp	Obsv
Individual Sports						
What types of exercise or physical activity did {CHILD} get at the places you just mentioned?						
INDIVIDUAL SPORTS	*P5TYPAC2*	Yes/No	Sports	Less	Trn	Part
MARTIAL ARTS	*P5TYPAC5*	Yes/No	Sports	Less	Trn	Part

* see Table 2

Activity Group Sub-Group ECLS-K Variable Description	ECLS-K Variable Name	Response Type*	(Breadth) Diversity Code	Aggregate Scoring Model Category Venue	 Impetus	 Involve
SPORTS (cont.)						
Group Sports						
What types of exercise or physical activity did {CHILD} get at the places you just mentioned?						
GROUP SPORTS	*P5TYPAC1*	Yes/No	Sports	Com	Rec	Part
Sports Team						
Outside of school hours, has {CHILD} ever participated in organized athletic activities, like basketball, soccer, baseball, or gymnastics?						
PARTCP IN ATHLETIC EVENTS	*P5ATHLET*	Yes/No	Sports	Less	Trn	Part
[In the last 12 months, did {CHILD} regularly get exercise through any of the following organizations?] Sports teams or leagues not affiliated with churches?						
EXERCISE-SPORTS TEAM/LEAGUE	*P5SPTEAM*	Yes/No	Sports	Less	Trn	Part
Recreational Sports						
What types of exercise or physical activity did {CHILD} get at the places you just mentioned?						
RECREATIONAL SPORTS	*P5TYPAC4*	Yes/No	Play	Com	Rec	Part
In the last 12 months, did {CHILD} regularly get exercise through any of the following organizations?						
EXERCISE-PUBLIC PARK/REC CTR	*P5PUBPRK*	Yes/No	Play	Com	Rec	Part
EXERCISE-PLACE OF WORSHIP	*P5CHURCH*	Yes/No	Play	Com	Rec	Part
EXERCISE-YMCA/OTHER ORG	*P5YMCA*	Yes/No	Play	Com	Rec	Part
EXERCISE-HEALTH CLUB	*P5HLTHCL*	Yes/No	Play	Com	Rec	Part

* see Table 2

Activity Participation Indicators

For each student and each sub-group listed in Table 8 a non-school activity participation indicator variable was created. These 24 variables were dichotomously coded: 1= Participation and 0=No Indication of Participation. For the sub-groups where more than one ECLS variable is available (*i.e.* Individual Sports, Sports Team, and Recreational Sports), any indication by any of the available fields of participation would suffice for coding 1 in the activity indicator variable. Conversely, all of the available fields must not indicate participation for the sub-group indicator to be coded 0. Indication of participation for fields of Response Type = 'Yes/No' was the obvious "Yes" (1) response. For fields of Response Type = 'perWeek' participation was indicated for a response of 2, 3 or 4. The use of dichotomous coding for the activity indicator variables is suitable because they function as count variables of nodes of activity (MacCallum, Zhang, Preacher, & Rucker, 2002). The activity participation indicators only received a code of 1 or 0 if the underlying ECLS-K variables had valid codes otherwise they were left system-missing so that the case would be list-wise deleted in later statistical processes.

Activity Breadth and Diversity Code Assignment

Each Sub-Group, or activity participation indicator variable, was given a Diversity Code, which was used to identify equivalent activities to facilitate Breadth of Participation scoring. Coding activity variables for consideration of the breadth of activity participation can be seen in Eccles and Barber (1999). Fredricks and Eccles (2006) used activity breadth as a control for self-selection, however they held 1 or 2 aggregate values constant to control analysis of a third. By Simpkins, Eccles, and Becnel (2008), the mature distinction between activity intensity and

breadth provides for analysis at the diversity of activity level. For this study, the Sub-Groups are assigned into the following diverse activity types:

1) Arts & Crafts	Arts or Crafts Activities; Arts or Crafts Lessons
2) Clubs	Organized Clubs; Scouts/Daisies; 4H/Farm Clubs
3) Dance	Dance Activities; Dance Lessons; Organized Performing Arts
4) Music	Family Sing; Music Lessons
5) Nature	Visited Zoo or Aquarium; Nature Lessons
6) Outings	Visited a Museum; Concert, Play, or Show; Sporting Event
7) Play	Family Games; Playground Activities; Recreational Sports
8) Sports	Family Sports; Sports Team; Group Sports; Individual Sports
9) Work	Chores; Build Things

The above delineations were a starting point in this exploratory analysis of the impact of activity breadth. The idea was to preserve diversity of activity experience, while associating those activities which implied similar exposure. Recreational Sports could be as much Sports or no more Play than Family Sports. Although 4H/Farm clubs could arguably be classed Nature, it was determined that club participation is the greater distinction. Likewise, both of the Nature activities could have been positioned as Outings the assigned categories held up under the present analysis.

Cluster Analysis of Activity Participation Indicators

As a prelude to declaring aggregation scoring models for the study, a hierarchical cluster analysis was run using the activity participation indicators. The resulting dendrogram (Figure 8) was used to lend support to the underlying premise of the aggregate scoring models proposed for this study.

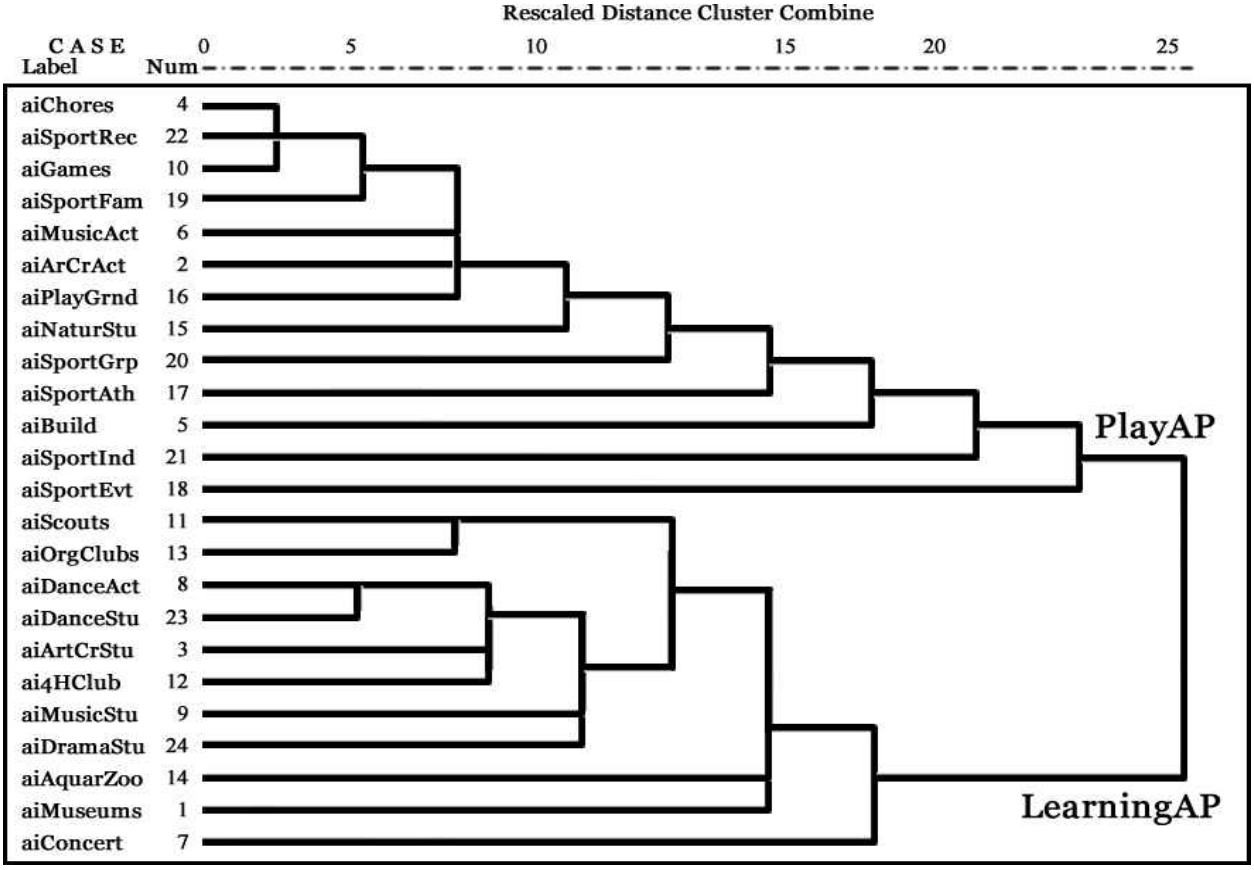


Figure 8: Hierarchical Cluster Dendrogram of Activity Indicators

In addition to providing a visual representation of the variable relationships the variables were assigned categories of a created control model view as distinguished by the two primary branches of the dendrogram: Play (*i.e.* Sports and Family activities) and Learning (*i.e.* Clubs, Lessons, and Outings).

Aggregate Scoring Models and Model Category Assignment

In nearly all of the EAP research since Marsh (1992) there have been aggregate scoring models. Early models distinguished school from community activities (*e.g.* Gerber 1996; Lisella & Sewertka, 1996; *cf.* Cooper & Valentine, 1999). More distinction was sought as in-school and out-of-school activities were tallied by Sports, Performance Activities or Performing Arts,

Academic Clubs, School Involvement, and Prosocial community activities (*e.g.* Eccles & Barber, 1999; Barber, Eccles, & Stone, 2001, Brown & Evans, 2005, Fredricks & Eccles, 2006). Recent studies have extended the out-of-school categories to include Community, Service, and Faith Based (*e.g.* Larson, Hansen, & Moneta, 2006, Simpkins, Eccles, & Becnel, 2008).

The function of aggregate scoring is not to assess the effect of participation in particular activities. Rather, the search is for associations with types of activities (*e.g.* in-school vs. out-of-school, structured vs. nonstructured, sports vs. the arts). The study is designed following the premise that aggregate scoring facilitates analysis of activity participation profiles. Although the aggregate scores do not address intensity of activity involvement, they do reflect differing levels of exposure to various activity groups and therefore the mix of activities in which the student participates.

For analysis of NSAP and BNSAP, three aggregate scoring models are proposed. Each Sub-Group, or activity participation indicator variable, was assigned to a category in each of the three aggregate scoring models to be used in analysis.

Aggregate Scoring Model 1 – by Venue

Model 1 is a location or venue model, which looks at nonschool activities based upon where the activity takes place. In this model, activities are family centered, or take place outside of the home for instruction or non-instructive purposes.

Model 1	Venue	The locus of the activity participation
Category 1	Family	These are activities participated in with family members
Category 2	Community	These are activities outside the home – not primarily instructive
Category 3	Lessons	These are activities outside the home – primarily instructive

Aggregate Scoring Model 2 – by Impetus

The impetus model deals with a second set of activity scoring aggregations. It provides for empirically testing the hypothesis that the incentive or impetus for choosing a particular activity, will partially explain the observed competence or performance differentials in the students. The model categorizes activities based upon their likely perception as leisurely, or as having a measure of training involved, or as engaged in just for the experience,

The categorizing distinctions are intentionally subtle, for example, Team Sports are not (Model 1) Lessons, but they do involve (Model 2) Training.

Model 2	Impetus	The incentive or motivation for the activity participation
Category 1	Recreation	These are activities participated in for fun
Category 2	Training	In these activities specific content is learned or discussed
Category 3	Experience	These are activities that generally leave lasting impressions

Aggregate Scoring Model 3 – by Involvement

Model 3 divides activities into those where the student is either an observer or a participant. The activities classified as observer are those of the outings and nature diversity groups.

Model 3	Involvement	The nature of the activity participation
Category 1	Observation	These are activities where the student's role is passive
Category 2	Participation	These are activities where the student's role is active

It is important not to take the model names and descriptions too literally. The purpose of the terminology in this section is for categorization, not to read actual motivations or rationale into student purposes for participating in the activities. When descriptive names are assigned to

the components in a factor analysis it does nothing towards describing the component variables – It only provides an identifier for continuing the dialogue. Any rationale speaks to this researcher and not to the processes at work in the students. Also, to avoid confusion with the literal meaning of the category names, for the remainder of the study all references to a category will be suffixed with AP (*e.g.* learning category activities – LearningAP).

Scoring NSAP and BNSAP

Non-school activities were scored for each model category for use as the independent variables of the study. Figure 9 shows the activity indicators, ordered by diversity code, within each aggregation model. By sequentially numbering each sub-group on the left, and each change in diversity code on the right, the maximum values (range) for each scoring variable are represented.

Aggregate summaries were scored in two ways, each adding 8 new variables per student. First, summaries were generated by totaling the non-school activity indicator variables that belong to each model category. As reflected in Figure 9, the model categories will have the following value ranges: FamilyAP (0-11), CommunityAP (0-5), LessonsAP (0-8), RecreationAP (0-7), TrainingAP (0-11), ExperienceAP (0-6), ObserveAP (0-5), and ParticipateAP (0-19). In the second series of summaries the variable Diversity Code was used to control incrementing the model category summary. Only one participating activity of a given diversity code was counted towards a model category's breadth of activity participation summary. The resulting activity breadth summaries will have the following ranges by model categories: FamilyAP (0-7), CommunityAP (0-4), LessonsAP (0-5), RecreationAP (0-4), TrainingAP (0-7), ExperienceAP (0-4), ObserveAP (0-2), and ParticipateAP (0-7).

Venue

	Family	DivCd	BoP
1	Arts or Crafts Activities	1	1
2	Family Sing	4	2
3	Visited Zoo or Aquarium	5	3
4	Nature Lessons	5	
5	Visited a Museum	6	4
6	Concert, Play, or Show	6	
7	Sporting Event	6	
8	Family Games	7	5
9	Family Sports	8	6
10	Chores	9	7
11	Build Things	9	

	Community		
1	Organized Clubs	2	1
2	Dance Activities	3	2
3	Playground Activities	7	3
4	Recreational Sports	7	
5	Group Sports	8	4

	Lessons		
1	Arts or Crafts Lessons	1	1
2	Scouts/Daisies	2	2
3	4H/Farm Clubs	2	
4	Dance Lessons	3	3
5	Organized Performing Arts	3	
6	Music Lessons	4	4
7	Sports Team	8	5
8	Individual Sports	8	

Impetus

	Recreation	DivCd	BoP
1	Dance Activities	3	1
2	Family Sing	4	2
3	Family Games	7	3
4	Playground Activities	7	
5	Recreational Sports	7	
6	Family Sports	8	4
7	Group Sports	8	

	Training		
1	Arts or Crafts Activities	1	1
2	Arts or Crafts Lessons	1	
3	Scouts/Daisies	2	2
4	4H/Farm Clubs	2	
5	Dance Lessons	3	3
6	Organized Performing Arts	3	
7	Music Lessons	4	4
8	Nature Lessons	5	5
9	Sports Team	8	6
10	Individual Sports	8	
11	Build Things	9	7

	Experience		
1	Organized Clubs	2	1
2	Visited Zoo or Aquarium	5	2
3	Visited a Museum	6	3
4	Concert, Play, or Show	6	
5	Sporting Event	6	
6	Chores	9	4

Involvement

	Observation	DivCd	BoP
1	Visited Zoo or Aquarium	5	1
2	Nature Lessons	5	
3	Visited a Museum	6	2
4	Concert, Play, or Show	6	
5	Sporting Event	6	

	Participation		
1	Arts or Crafts Activities	1	1
2	Arts or Crafts Lessons	1	
3	Organized Clubs	2	2
4	Scouts/Daisies	2	
5	4H/Farm Clubs	2	
6	Dance Activities	3	3
7	Dance Lessons	3	
8	Organized Performing Arts	3	
9	Family Sing	4	4
10	Music Lessons	4	
11	Family Games	7	5
12	Playground Activities	7	
13	Recreational Sports	7	
14	Family Sports	8	6
15	Sports Team	8	
16	Group Sports	8	
17	Individual Sports	8	
18	Chores	9	7
19	Build Things	9	

Dendrogram Control Model

	Play - Sports and Family	DivCd	BoP
1	Arts or Crafts Activities	1	1
2	Family Sing	4	4
3	Nature Lessons	5	5
4	Sporting Event	6	6
5	Recreational Sports	7	7
6	Family Games	7	
7	Playground Activities	7	
8	Family Sports	8	8
9	Sports Team	8	
10	Group Sports	8	
11	Individual Sports	8	
12	Chores	9	9
13	Build Things	9	

	Learning - Clubs, Lessons and Outings		
1	Arts or Crafts Lessons	1	1
2	Organized Clubs	2	2
3	Scouts/Daisies	2	
4	4H/Farm Clubs	2	
5	Dance Activities	3	3
6	Dance Lessons	3	
7	Organized Performing Arts	3	
8	Music Lessons	4	4
9	Visited Zoo or Aquarium	5	5
10	Visited a Museum	6	6
11	Concert, Play, or Show	6	

Figure 9: Model Variables by Category, Diversity Code, and Breadth of Participation

In addition to total NSAP and total BNSAP variables, dendrogram model variables – PlayAP (0-13; B=0-7) and LearningAP (0-11; B=0-6) will also be generated. Thus, the five data views, (*i.e.* Total Activity Scores, Venue Model Scores, Impetus Model Scores, Involvement Model Scores, and Dendrogram Model Scores) are considered for both NSAP and BNSAP in all of the analysis procedures for the remainder of this study.

Control Variable Preparation

Cognitive Control Variable Composite Construction

A cognitive control composite was constructed as a count variable by summing variables indicating whether the child was read to at home, visited the library, had weekly computer usage, or was tutored in reading (P5READBO, P5LIBRAR, P5HOMECM, P5TUTRDG from Table 4). The math and science tutoring variables weakened the association between cognitive composite and the dependent and independent variables and were removed from the composite formula. Reading to child, visiting the library and home computing were each coded 1 where indicated. However, correlations between the calculated composite and the reading IRT scale score were improved when the reading tutor variable was coded -1. Thus, the values calculated for the cognitive composite ranged from -1 to 3.

Demographic Control Variables

The demographic variables (GENDER, RACE, W5MOMED, and W5SESQ) were recoded to remove negatively coded responses (*i.e.* -1 NOT APPLICABLE, -8 DON'T KNOW, and -9 NOT ASCERTAINED) by changing those case variables to system-missing to facilitate list-wise deletion in later statistical processes.

Data Analysis - Procedures

Justification of Selected Cases

Even if the statistical model is firmly grounded in theory, and solidly constructed such that model parameters and variables promise meaningful interpretation (Bergman & Trost, 2006), there will be attendant data issues. Missing data can be problematic for some statistical procedures because of the variable selection requirements of certain regressions. Therefore, third grade students were list-wise excluded who have either inadequate responses for constructing a social competence composite, or a missing reading IRT Scale score.

Performance Variable Outliers

Boxplots were obtained from analysis of the Reading IRT Scale Score (C5R3RSCL) distributions to identify outliers for determining the base sample population. This process was executed both before and after construction of the social competence composites to account for the shift in the sample which resulted from list-wise deletions.

Descriptive Statistics

The data of this research consists of demographic and cognitive controls, a reading score, a social competence composite, and multiple models of activity aggregate scores. Descriptive statistics were generated to report statistical measures for all of the variables. Reliability alphas were identified for the variables that contributed to the sub-scales of the composite. Also, demographic crosstabs were presented for the final sample.

Multiple Linear Regressions

Social Competence as Predictor

Bivariate correlations between social competence and reading were an integral part of the construction of the composite. Thereafter, linear regressions were run to answer the question on the relationship between student social competence and reading performance. First a single model weighted least squares regression was run with the reading IRT score regressed on social competence. This was reinforced by a step-wise regression which introduced the demographic controls (SESQ, MOMED, RACE, then GENDER) one variable per step before adding social competence as a fifth model.

NSAP and BNSAP as Predictors

For each aggregation data view, multiple linear regressions were generated with the social competence composite as the dependent variable and the constituent model participation summaries as predictors. Similarly, linear regressions were generated with the reading IRT scale score as the dependent variable, and the non-school activity summary variables as the predictors. However, because of the associations testing via multiple regressions (below), subsequent regressions controlling for the demographic variables were not executed here.

Cluster Analysis

One consequence of the multiple data views in this study is that the demographic response tended to be different depending on the view under consideration. As a result, two-step cluster analyses were run including RACE, SESQ, and MOMED as categorical variables with the respective activity summaries as continuous variables. Two results from cluster analysis are important here. First, the number of clusters is not the same for the same categorical variables

given different continuous variables. Second, clusters do not converge in ascending sequence. Figure 10 illustrates the method used to resolve both of these issues.

Cluster Variable		Clusters	Rank via w/Cluster Variation						Recoded to Cluster					
			low-low	low	low-med	hi-med	hi	hi-hi						
TSC_0106	tActivity	3	1		2		3		1		2		3	
TSC_0116	Tvenue	3	2		1		3		1		2		3	
TSC_0126	tImpetus	2	2			1			1			2		
TSC_0136	tinvolve	6	4	1	2	3	6	5	1	1	2	2	2	3
TSC_0156	tDendo	3	2		1		3		1		2		3	
TSC_0206	tBreadth	2	2			1			1			2		
TSC_0216	bVenue	3	2		3		1		1		2		3	
TSC_0226	bImpetus	3	3		2		1		1		2		3	
TSC_0236	bInvolve	2	2			1			1			2		
TSC_0256	bDendo	2	2			1			1			2		

Figure 10: Cluster Recoding via Model View

First, the shaded cluster variable was used to control the model category for comparisons between NSAP and BNSAP. In order to have 3 clusters in all comparisons, the NSAP clustering was used in all instances except the impetus model. Second, the cluster variables were recoded, using the within-cluster variations to rank the identified clusters according to the relative means. In the NSAP involvement model where 6 clusters were identified, the recoding also reduced the number of clusters to 3. Clusters 2, 3, and 6 all hovered about the true mean and were therefore recoded to cluster 2. In the NSAP venue model, cluster 2 is highlighted because the MOMED response was "some college" for all of the students in the cluster. In the same way the NSAP involvement and dendrogram models and the BNSAP venue model are highlighted because SESQ indicated that all of the students in the cluster are from the 5th SES quintile.

Theoretical Model Testing

Ultimately this study attempts to answer its research questions by validating iterations of the theoretical model template of Figure 11.

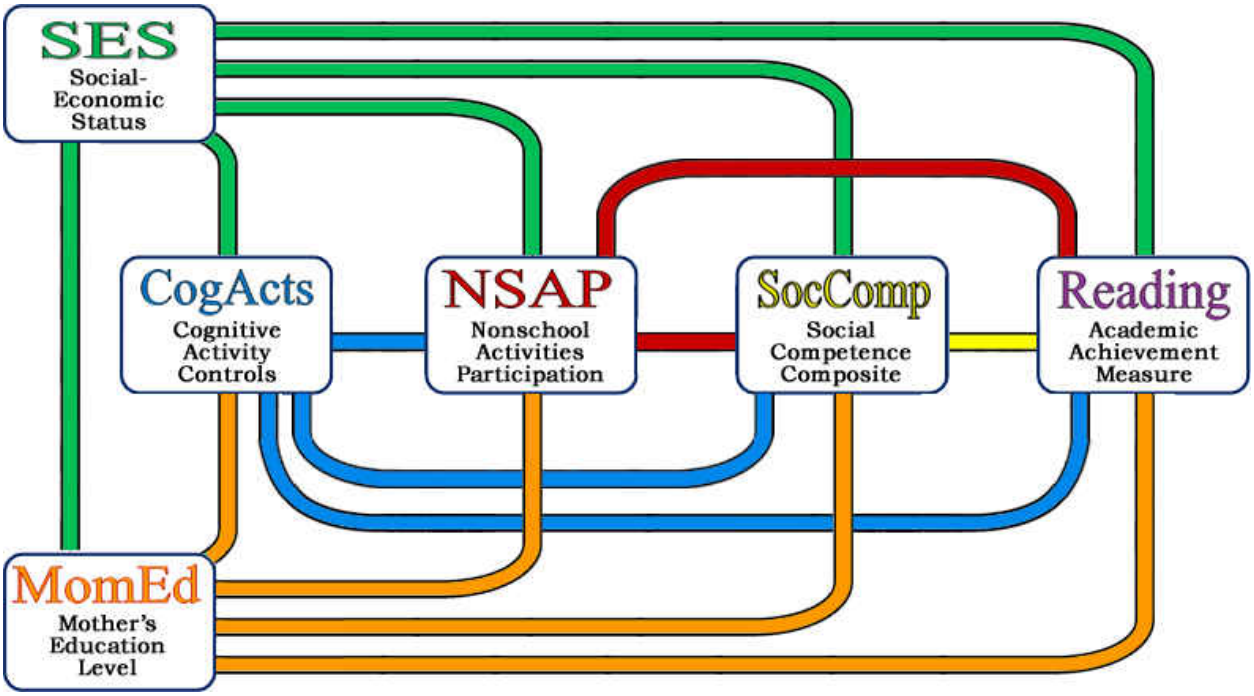


Figure 11: Total NSAP/BNSAP Theoretical Model Template

The aggregation scoring views have multiple activity predictors and convolute the model somewhat, but the results are nevertheless instructive. Figure 12 shows the templates for the models with multiple activity categories.

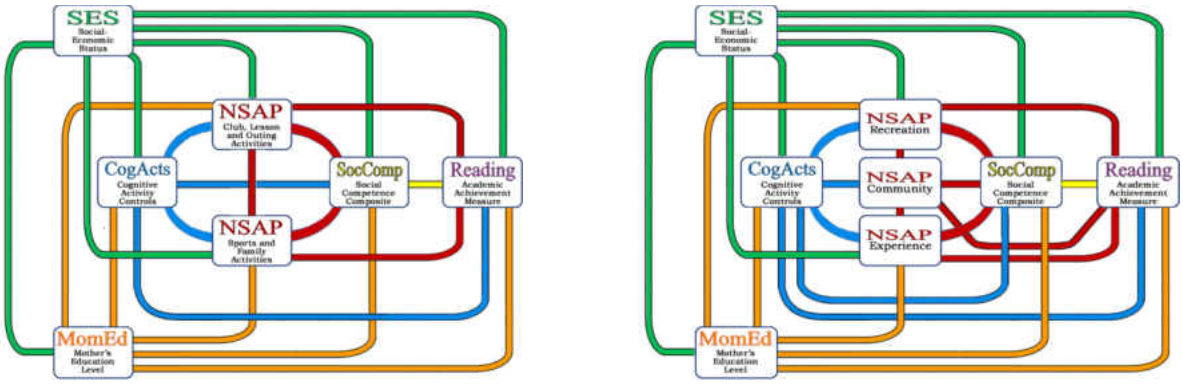


Figure 12: NSAP/BNSAP Theoretical Model Templates for 2 and 3 Activity Categories

Models were built for NSAP and BNASP for each of the five views previously discussed. For each model the complete sample was analyzed for all students, then by gender. Thereafter, the model sample was reselected for each cluster and analyzed in total then by gender.

Significant associations were identified for the models depicted in Figure 11 and Figure 12 by backward multiple regression - beginning with all of the model variables and via successive regressions removing the predictors that did not significantly contribute to R^2 (*i.e.* $p > 0.05$). Using the applicable models of Table 9, the first model was replicated for each of the alternative reading measures. This continued through all variables of the model by shifting the first entered predictor to become the dependent variable of the next model level.

Table 9 – Multiple Regression Models for Theoretical Model Testing

Model			DEPENDENT	Predictors: METHOD=ENTER							
Regressed Prior			Reading 3rd Gr.	Reading 1st Gr.	Competence	ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
Reading Change			Reading Change		Competence	ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
Reading 3rd Gr.			Reading 3rd Gr.		Competence	ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
Reading Pct Chg			Reading Pct Chg		Competence	ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
Reading Pct Cut			Reading Pct Cut		Competence	ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
2	2	2	Competence			ActivityCat1	ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
3	3	3	ActivityCat1				ActivityCat2	ActivityCat3	Cognitive	MomEd	SESQ
	4	4	ActivityCat2			ActivityCat1		ActivityCat3	Cognitive	MomEd	SESQ
		5	ActivityCat3			ActivityCat1	ActivityCat2		Cognitive	MomEd	SESQ
4	5	6	Cognitive							MomEd	SESQ
5	6	7	MomEd								SESQ

Note that for the aggregation models with two or three categories, the categories other than the dependent are always included in the activity model levels of the theoretical model testing. This held promise for interpreting the student participation profiles by providing additional controls for selection effects (*cf.* Fredricks & Eccles, 2006).

Assumptions

One misunderstood concept of activity participation research is that the counts impart information from which inferences regarding a student's motivation, impression, or take-away can be made. On the contrary, the counts reflect a measure of the points of social contact from which activity participation derives its benefit. Dichotomous treatment of activity participation assumes that any positive response, relative to an activity, can be represented as participation. In some instances, responses to alternative activity venues are accepted as alternative indications of participation. The validity of this approach may be tested somewhat by systematically removing the effect of following these assumptions from the calculated values of the variables used in the study. Figure 21 (*in* APPENDIX H) illustrates how several optional exercise activity variables were excluded from the calculation of the recreational sports activity indicator.

Delimitations and Limitations

1. *Variables of Interest* – The variables selected for this study were limited by the variables available in the ECLS dataset. Questions asked in a future study of activities could pursue better participation indicators, and possibly some questions regarding affect or disaffect where there is no participation in given activities.

Chapter Summary

This chapter has explained in detail the processes followed to prepare the variables that were used in the analyses of this study. This is a quantitative cross-sectional study of activity participation by third grade students of the Elementary Childhood Longitudinal Study began in

1999. By integrating cluster-analytic techniques with theoretical model testing the study extends the EAP research metric to not only assess the impact of greater activity participation, but provides for demographic profiling of the students at various levels of participation. The next chapter reports the descriptive statistics of the study variables and inferential findings.

CHAPTER FOUR - RESULTS

Introduction

This study investigated the associations of pre-adolescent participation in activities with measures of student development and reading performance. The conceptual framework postulated that student participation in nonschool activities would contribute to social competence and strengthen academic performance. Further, it was hypothesized that observed associations would be more pronounced if the activity summaries were filtered for breadth of participation.

The study sought to answer the following research questions:

1. Is there a relationship between student social competence and reading performance?
2. Does a positive association exist between non-school activity participation (NSAP) and student social competence?
3. Does a positive association exist between NSAP and reading performance?
4. Do breadth of non-school activity participation (BNSAP) summaries associate more strongly with student social competence than the NSAP totals do?
5. Do BNSAP summaries associate more strongly with reading performance than the NSAP totals do?

The research design of the current study provided a social competence composite which confirmed prior research findings that social competence measures significantly account for the variance in academic performance. In addition, applying the EAP aggregate scoring metric across several models produced many significant associations between activity participation and both social competence and reading performance. These results were obtained while controlling for demographics, the cognitive composite, as well as prior reading scores.

Proceeding with the research variables prepared earlier, this chapter first reviews the data for its appropriateness for use in the analyses outlined for the study. Descriptive statistics are discussed considering the representative nature of the sample and whether statistical assumptions are met by the variable distributions. Finally, cluster analysis results delineate the sub-samples processed in theoretical model testing iterations wherein the results test the study‘s main hypotheses.

Descriptive Statistics

The cluster analysis profiles are revealed followed by a review of the model associations, detailing how the findings relate to the five study hypotheses.

Profile of Selected Students

After list-wise deletion of cases incomplete with regard to the study variables, the student sample was arrived at by removing outliers found in the following performance variables: spring 1st Grade reading (C4R3RSCL), spring 3rd Grade reading (C5R3RSCL), change in IRT scale score (C5READCHG), and the indexed social competence composite (CompetenceIF).

Thus, the 6,009 cases which remain after resolving the outliers represent the sample used for all figures and tables in this chapter.

Table 10 presents a cross-tabulation of the demographic variables within gender. These distributions provide a profile of the student sample used to complete the study.

Table 10 – Cross-Tabulation of Categorical Variables

	GENDER					
	Boy		Girl		Total	
Race						
White, Non-Hispanic	2,165	70.8%	2,047	69.3%	4,212	70.1%
Black or African American	241	7.9%	247	8.4%	488	8.1%
Hispanic, Race Specified	205	6.7%	193	6.5%	398	6.6%
Hispanic, Not Specified	168	5.5%	168	5.7%	336	5.6%
Asian	131	4.3%	133	4.5%	264	4.4%
Native Hawaiian, Other	40	1.3%	40	1.4%	80	1.3%
American Indian or Alaska Native	43	1.4%	49	1.7%	92	1.5%
More than one race, Non-Hispanic	63	2.1%	76	2.6%	139	2.3%
	3,056		2,953		6,009	
Socioeconomic Status (SES) Quintile						
First Quintile	271	8.9%	283	9.6%	554	9.2%
Second Quintile	455	14.9%	459	15.5%	914	15.2%
Third Quintile	612	20.0%	562	19.0%	1,174	19.5%
Fourth Quintile	789	25.8%	814	27.6%	1,603	26.7%
Fifth Quintile	929	30.4%	835	28.3%	1,764	29.4%
	3,056		2,953		6,009	
Mother's Education Level						
8th Grade or Below	54	1.8%	42	1.4%	96	1.6%
9th – 12th Grade	119	3.9%	106	3.6%	225	3.7%
HS Diploma / Equivalent	674	22.1%	664	22.5%	1,338	22.3%
Vocational / Technical Program	164	5.4%	151	5.1%	315	5.2%
Some College	975	31.9%	967	32.7%	1,942	32.3%
Bachelor's Degree	638	20.9%	644	21.8%	1,282	21.3%
Graduate / Professional School NO Degree	105	3.4%	94	3.2%	199	3.3%
Master's Degree (MA, MS)	245	8.0%	203	6.9%	448	7.5%
Doctorate or Professional Degree	82	2.7%	82	2.8%	164	2.7%
	3,056		2,953		6,009	

Illustrative demographic sub-sample profiles of the students, as grouped for the statistical analyses, are presented with the cluster analysis results.

Profile of Analytic Sample

Social Competence Composite

The calculations for construction of the social competence composite from component loadings and the percent of variance explained are detailed in APPENDIX A. The values related to the final sample of 6,009 cases are detailed in Table 11. With the exception of the comparison variables by parents for structured free play (FinPSTRUCT) and by the student on peers (FinCSDQPRC), significant at $p < 0.05$, all other bivariate correlations with reading were significant at $p < 0.01$.

Table 11 – Selected Final Social Competence Composite Details

Recoded Variable					Factor Weighted Multiplier							Factor Derived Variables			
				Cronbach's Alpha	Component Loadings 1	2	% of Variance Explained		recoded var max		variable val mult		Cronbach's Alpha	Correlations Competence	Reading
RP5S0LVE	Parent	Skills	0.529	0.690	0.725		27.936	53.942	3.3927	4	0.8482	FinPS0LVE	0.529	0.688	0.376	0.386
RP5ATTENI					0.734				3.4349	4	0.8587	FinPATTENI			0.451	0.204
RP5BEHAVE					0.627				2.9341	4	0.7335	FinPBEHAVE			0.311	0.124
RP5PRONOU					0.627				2.9341	4	0.7335	FinPPRONOU			0.244	0.313
RP5SAMEAG					0.607				2.8405	4	0.7101	FinPSAMEAG			0.195	0.096
RP5PHYACT		Active		0.745		0.857	26.007		5.0082	3	1.6694	FinPPHYACT		0.772	0.294	0.060
RP5STRUCT						0.844			4.9322	3	1.6441	FinPSTRUCT			0.232	0.002
RP5ACTIVE						0.774			4.5232	4	1.1308	FinPACTIVE			0.284	0.055
RC5SDQSBC	Child	Class	0.677	0.692	0.870		35.344	62.267	4.1236	4	1.0309	FinCSDQSBC	0.663	0.701	0.412	0.051
RC5SDQMTC					0.698				3.3088	4	0.8272	FinCSDQMTC			0.249	-0.056
RC5SDQRDC					0.659				3.1209	4	0.7802	FinCSDQRDC			0.343	0.221
RC5SDQPRC					0.648				3.0692	4	0.7673	FinCSDQPRC			0.305	-0.019
RC5SDQINT		Beh		0.747		0.892	26.924		5.2259	4	1.3065	FinCSDQINT		0.747	0.498	0.373
RC5SDQEXT						0.879			5.1514	4	1.2879	FinCSDQEXT			0.563	0.257
RT5SCINT	Teacher		0.906	0.906	0.967		69.249	69.249	4.7420	4	1.1855	FinTSCINT	0.910	0.910	0.722	0.246
RT5INTERP					0.922				4.5191	4	1.1298	FinTINTERP			0.693	0.244
RT5CONTRO					0.916				4.4918	4	1.1230	FinTCONTRO			0.677	0.220
RT5LEARN					0.818				4.0098	4	1.0024	FinTLEARN			0.705	0.419
RT5EXTERN					0.797				3.9079	4	0.9770	FinTEXTERN			0.627	0.209
RT5INTERN					0.475				2.3294	4	0.5824	FinTINTERN			0.365	0.217

Tests for Reliability

The Cronbach's alphas (α) for variables contributing to the social competence sub-scale composites (in Table 11) indicate generally acceptable (.688 – .910) internal consistency of the sub-scale component variables. This suggests that the variables similarly address the competency constructs represented by the components. However, the alphas reported for the sub-scale variables irrespective of components range from "questionable" (.663) for student responses to "poor" (.529) for parent variables (*see* George & Mallery, 2009: *i.e.* $\alpha > .9$ – Excellent, $\alpha > .8$ – Good, $\alpha > .7$ – Acceptable, $\alpha > .6$ – Questionable, $\alpha > .5$ – Poor, and $\alpha < .5$ – Unacceptable), thus strengthening the argument for using a factored approach to composite construction.

Cronbach's alphas were also generated for the aggregate scores of activity participation within the categories of aggregate scoring models. These are listed in Table 12. That the alphas fall below .6 is desired, since the categories were designed to represent distinction rather than commonality.

Table 12 – Cronbach's Alphas for Aggregate Scoring Models

	NSAP	BNSAP
Venue	0.543	0.531
Impetus	0.588	0.501
Involvement	0.424	0.368
Dendrogram	0.329	0.236

Dependent and Independent Variables

Table 13 details the statistical measures of central tendency for the dependent and independent variables. Activity participation variables are presented for NSAP and BNSAP, grouped by the five model views used in the study.

Table 13 – Descriptive Statistics of Dependent and Independent Variables

		N	Range	Minimum	Maximum	Mode	Median	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	StdErr	Statistic	Statistic	Statistic	Std.Err	Statistic	StdErr
Reading IRT Scale Score															
	Reading 1st Gr.	6009	111.100	18.670	129.770	64.830	72.770	75.043	0.264	20.499	420.219	0.379	0.032	-0.387	0.063
	Reading 3rd Gr.	6009	119.450	56.150	175.600	118.360	124.710	123.445	0.292	22.622	511.751	-0.376	0.032	-0.307	0.063
	Reading Change	6009	89.640	3.350	92.990	30.720	47.980	48.403	0.210	16.278	264.969	0.085	0.032	-0.312	0.063
	Reading Pct Chg	6009	477.089	2.590	479.679	74.804	66.290	71.038	0.448	34.745	1207.203	1.203	0.032	4.763	0.063
	Reading Pct Cut	6009	9.000	1.000	10.000	2.000	6.000	5.500	0.037	2.872	8.249	0.000	0.032	-1.224	0.063
Social Competence Composite															
	CompetenceIF	6009	170.201	115.439	285.640	115.440	202.105	199.932	0.392	30.396	923.888	-0.261	0.032	-0.375	0.063
Activity Participation															
Total															
NSAP	Activity	6009	20	3	23	13	13	13.345	0.038	2.948	8.688	-0.058	0.032	-0.055	0.063
BNSAP	Breadth	6009	7	2	9	7	7	7.020	0.016	1.243	1.545	-0.436	0.032	0.049	0.063
Venue Model															
NSAP	FamilyAP	6009	9	1	10	7	7	6.947	0.020	1.584	2.510	-0.330	0.032	0.004	0.063
	CommunityAP	6009	5	0	5	3	3	3.091	0.013	1.025	1.050	-0.467	0.032	0.245	0.063
	LessonsAP	6009	9	0	9	3	3	3.307	0.018	1.434	2.056	0.436	0.032	0.018	0.063
BNSAP	FamilyAP	6009	6	1	7	6	6	5.536	0.014	1.051	1.104	-0.612	0.032	0.440	0.063
	CommunityAP	6009	4	0	4	2	2	2.395	0.010	0.803	0.644	-0.134	0.032	0.210	0.063
	LessonsAP	6009	6	0	6	2	3	2.740	0.014	1.118	1.249	0.406	0.032	-0.060	0.063
Impetus Model															
NSAP	RecreationAP	6009	7	0	7	6	6	5.432	0.013	1.017	1.033	-0.983	0.032	1.194	0.063
	TrainingAP	6009	11	0	11	5	5	4.831	0.021	1.632	2.662	0.137	0.032	0.067	0.063
	ExperienceAP	6009	6	0	6	3	3	3.082	0.017	1.298	1.684	0.162	0.032	-0.656	0.063
BNSAP	RecreationAP	6009	4	0	4	3	3	3.038	0.007	0.533	0.285	-0.135	0.032	1.234	0.063
	TrainingAP	6009	7	0	7	4	4	4.152	0.016	1.267	1.605	-0.184	0.032	0.028	0.063
	ExperienceAP	6009	5	0	5	3	3	2.886	0.014	1.110	1.233	-0.033	0.032	-0.720	0.063
Involvement Model															
NSAP	ObserveAP	6009	5	0	5	2	2	2.510	0.016	1.240	1.537	0.086	0.032	-0.638	0.063
	ParticipateAP	6009	16	2	18	11	11	10.835	0.030	2.309	5.330	0.000	0.032	0.107	0.063
BNSAP	ObserveAP	6009	3	0	3	2	2	2.048	0.011	0.846	0.716	-0.480	0.032	-0.589	0.063
	ParticipateAP	6009	5	2	7	5	6	5.550	0.012	0.938	0.879	-0.279	0.032	-0.108	0.063
Dendrogram Control Model															
NSAP	PlayAP	6009	11	2	13	11	11	10.556	0.023	1.813	3.287	-0.802	0.032	0.546	0.063
	LearningAP	6009	11	0	11	2	3	2.788	0.026	2.017	4.069	0.586	0.032	-0.092	0.063
BNSAP	PlayAP	6009	4	2	6	6	6	5.561	0.009	0.724	0.524	-1.654	0.032	2.284	0.063
	LearningAP	6009	6	0	6	2	2	2.041	0.018	1.359	1.848	0.351	0.032	-0.433	0.063

Model Assumptions for Linear Regressions

The linear regressions which drive testing of the model associations for this study assume that model criterion variables are independent, normally distributed (normality), all have the same variance (homoscedasticity), and the true relationship between the means of the response and explanatory variables approaches a straight line (linearity). This study defers to the design and data collection of the ECLS-K and assumes that independence is satisfied. Tests to resolve the assumptions of normality, homoscedasticity and linearity are presented below.

Tests for Normality

The assumption of normal distributions for dependent variables is assumed a necessary prerequisite to linear regression model adequacy. Histograms depicting the frequency curves for the 3rd Grade reading IRT scale score and the social competence composite appear in Figure 13. Both are slightly negatively skewed, and the reading curve is more platykurtic than social competence, which is nearly mesokurtic. Notwithstanding, the characteristics of both variables are within the acceptable range for declaring the curves normal.

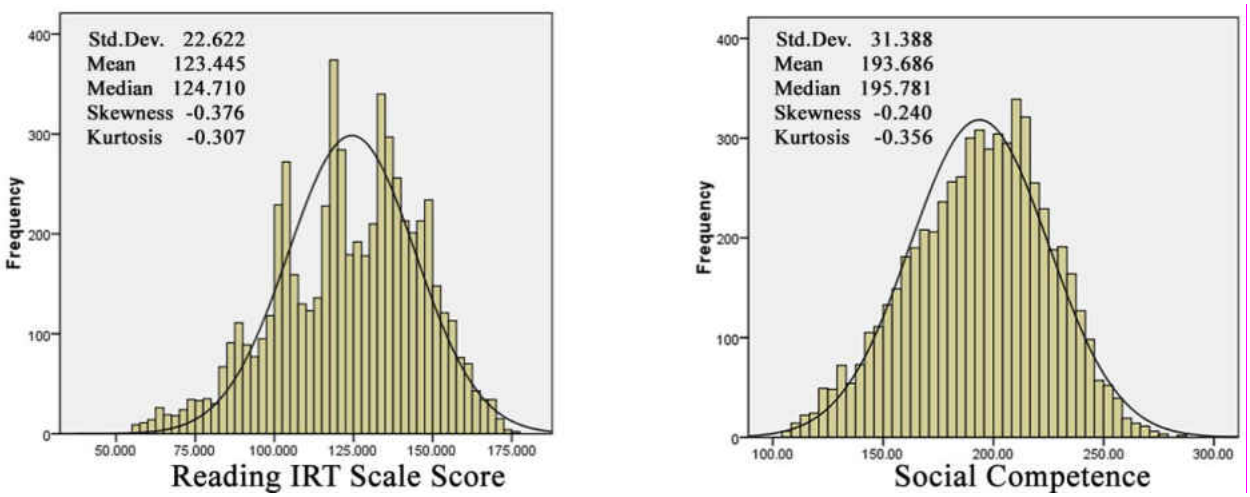


Figure 13: Normality Curves for Dependent Variables

From the skewness and kurtosis statistics reported in Table 13, it can be determined that all of the aggregate scores of activity participation reflect normally curved distributions. However, Hayes (2005) points out that least squares regression makes no assumption about predictor variable distributions, and is not really concerned with the dependent distribution, further stating, "assumption of normality applies to *the conditional errors in estimation*" (p. 298, *emphasis mine*). Accordingly, the criterion for normal distribution adequacy was validated using normal probability plots of the reading IRT scale score and the social competence composite dependent variables.

To produce normal probability plots for weighted least squares regressions in SPSS 17.0, saved residual values from non-weighted regressions needed to be transformed into weighted variables by multiplying them by the square root of the distribution weight. The points of the plotted probability for the dependent variables clustered around the expected lines of equality with normal distribution probabilities. There appeared to be no significant deviation from normality for either variable, thus the assumption of normality is met.

Tests for Homoscedasticity and Linearity

The two assumptions for constant variance of residuals (homoscedasticity) and that the random errors have zero mean (linearity) were tested simultaneously using a scatterplot of the standardized residuals of the study's main dependent variables. The scatterplot revealed random plots around zero, and therefore violations of the constant variance and zero means assumptions are not suggested and the assumptions for homoscedasticity and linearity are met.

Tests for Multicollinearity

Multicollinearity is indicated by a high correlation between predictor variables in a regression model. This generally occurs when two or more predictors are measuring the same thing. The ramifications are generally high standard errors regarding the individual predictors due to an inability to discern redundancy between the highly correlated variables. Collinearity can be anticipated by reviewing the correlations between expected predictors. Bivariate Pearson correlations above .8 can be problematic. If such is the case variance inflation factors (VIF) can subsequently be reviewed in the regression output to see if they are at or around 5, and if present one or more of the variables would need to be removed.

Table 14 presents correlations between the dependent (reading and social competence) and the independent (activity participation score) variables of the study. Pearson Correlations are all < .470 and report 2-tailed significance at $p < 0.01$. Therefore, review of cross-relationships between the model category variables indicates multicollinearity was not an issue for this study.

Table 14 – Correlations of Dependent and Independent Variables

	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
	CommunityAP		LessonsAP		Social Competence		Reading IRT Scale	
FamilyAP	.169	.132	.272	.251	.075	.079	.061	.062
CommunityAP			.469	.463	.063	.077	.122	.118
LessonsAP					.142	.145	.228	.225
	TrainingAP		ExperienceAP		Social Competence		Reading IRT Scale	
RecreationAP	.360	.283	.212	.110	.051	.078	.065	.031
TrainingAP			.392	.371	.133	.127	.196	.175
ExperienceAP					.091	.088	.126	.126
	ParticipateAP				Social Competence		Reading IRT Scale	
ObserveAP	.323	.226			.079	.090	.083	.113
ParticipateAP					.124	.122	.191	.147
	LearningAP				Social Competence		Reading IRT Scale	
PlayAP	.197	.161			.057	.070	.102	.055
LearningAP					.142	.129	.181	.177

Cluster Analysis of Aggregate Scores

The final sample of 6,009 cases, following listwise deletion and resolution of all outliers, was processed through two-step cluster analysis including RACE, SESQ, and MOMED as the categorical variables against the activity summaries of the five aggregate model views. However, whereas Table 5 listed White students as 56.3% of the ECLS-K sample, Table 10 reports 70.1% White students in the current study sample. The tables also demonstrate a corresponding shift in the originally coded SES quintiles, yet the original SESQ codes were continued in the study to preserve the nationally representative socioeconomic distinctions. As in the preliminary analysis, the cases per cluster varied with each model.

These cluster analyses yielded demographic profiles of the students participating in the various activity aggregation model views. In the total activity view the clusters contain the White students of SES quintile 5, the White students of SES quintiles 3 and 4, and finally the remaining White students combined with all non-White students. The venue model placed the White students of SES quintiles 4 and 5 in the first cluster, the upper quintile non-White students in cluster 2, and followed with the remaining students. Impetus and involvement models were nearly identical, placing the White students of SES quintile 5 students in cluster 1, all of the SES quintile 3 and 4 students in cluster 3, and the remaining students in cluster 2. The dendrogram view distributed the students by race more like the SESQ/MOMED execution, but placed some SES quintile 3 and 4 students in cluster 3, most likely due to MOMED.

The impact of the racial imbalance resulted in model differences that, while informative, would be problematic for model comparisons. Therefore two-step cluster analysis was repeated, removing RACE as a categorical variable. SESQ became the dominating influence, and all of the

models yielded the same cases per cluster. Figure 14 gives the demographic view of the clusters used to select the sub-samples of the study.

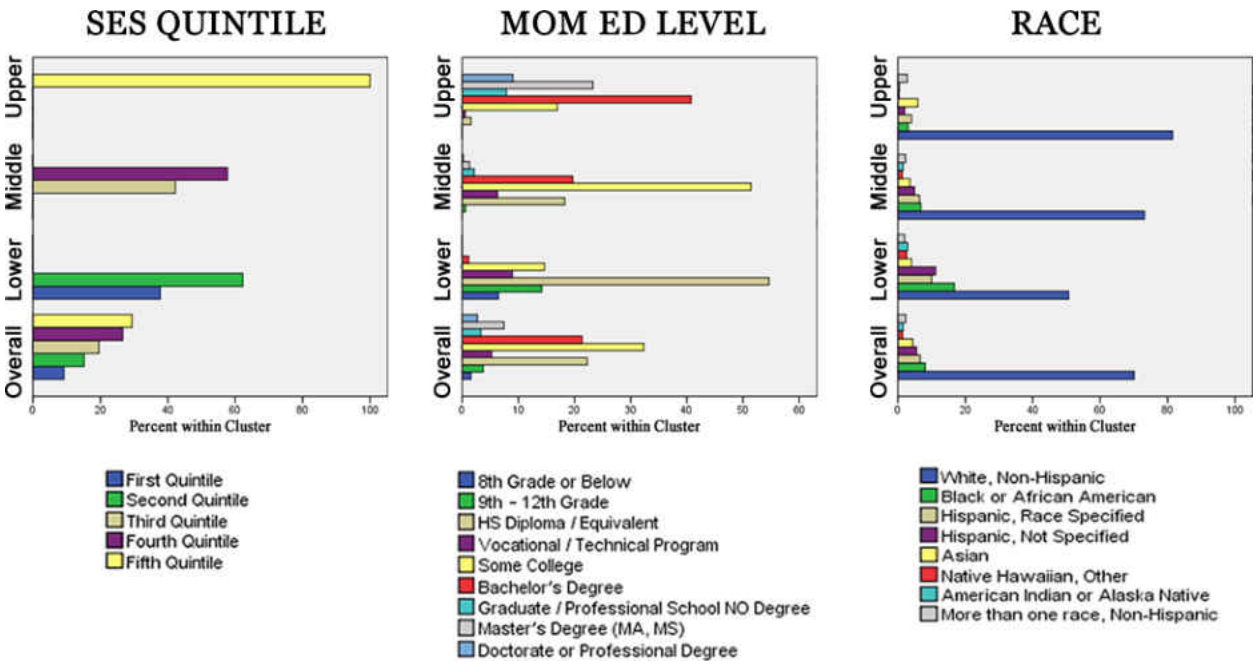


Figure 14: Within Cluster Distributions by Demographic Control Variables

Revising Models of the Study Variable Associations

The multiple regressions (as delineated in Table 9) used to revise the model associations were run for each aggregation model view. Because of the wealth of data from the many iterations, results are presented in a variety of forms. Select illustrative models of observed associations are annotated and depicted in APPENDIX C. Comparative views of the alternative reading measure analyses and the significant standardized beta coefficients for social competence are tabled in APPENDIX D. Similarly, comparative views of the alternative reading measure analyses by aggregate model view and the significant standardized beta coefficients for the activity aggregate scores are presented in the tables of APPENDIX E. APPENDIX F presents

a table of the beta coefficients for the activity aggregate scores and the cognitive activities composite relative to social competence – the secondary outcome variable (model 2 of Table 9). And, in APPENDIX G the interrelationships between the independent variables are reported by aggregate model view. Finally, the appendix data is succinctly excerpted into tables presenting the results pertinent to the tests of the study's main hypotheses (below).

The revised total activity model shows an absence of significant associations between MOMED and social competence in both the NSAP (Figure 15) and BNSAP (Figure 16) models. Unexpectedly, Figure 16 also omitted an association between SES and BNSAP scores, indicating that the standardized beta coefficient was not found to be significant. However, the cognitive activity composite appears with persistent associations with both independent (participation) and dependent (performance) variables.

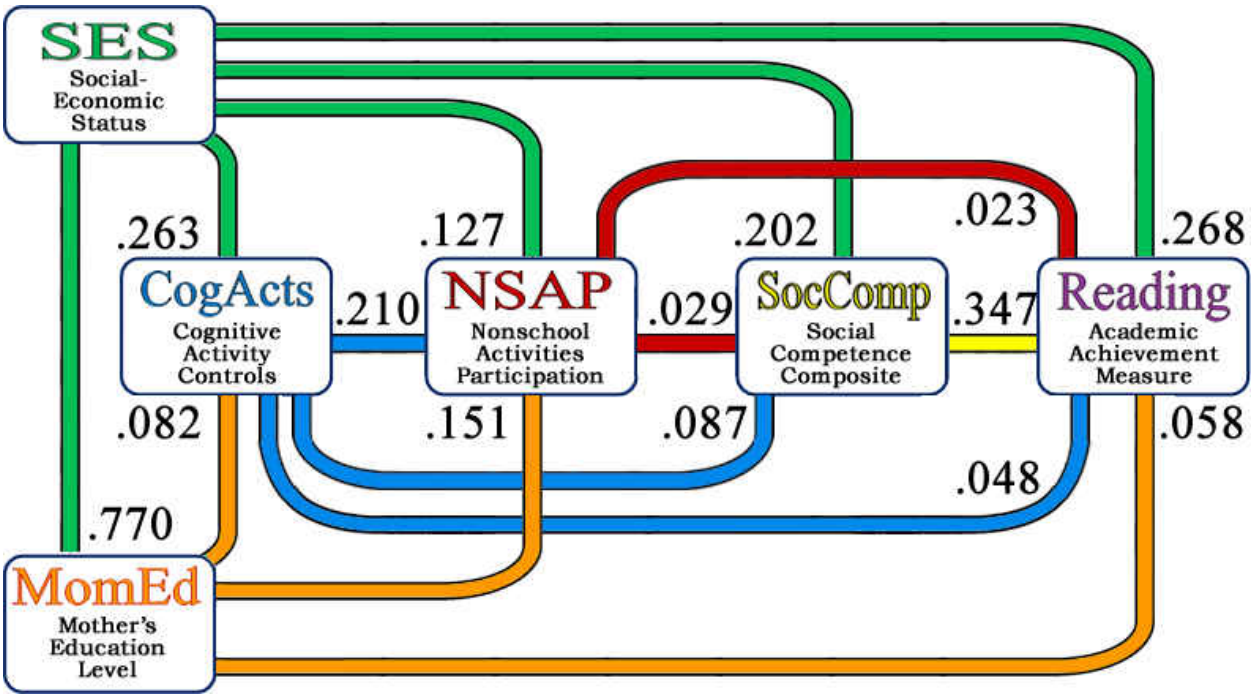


Figure 15: Model Analysis - Total Activity (NSAP) View

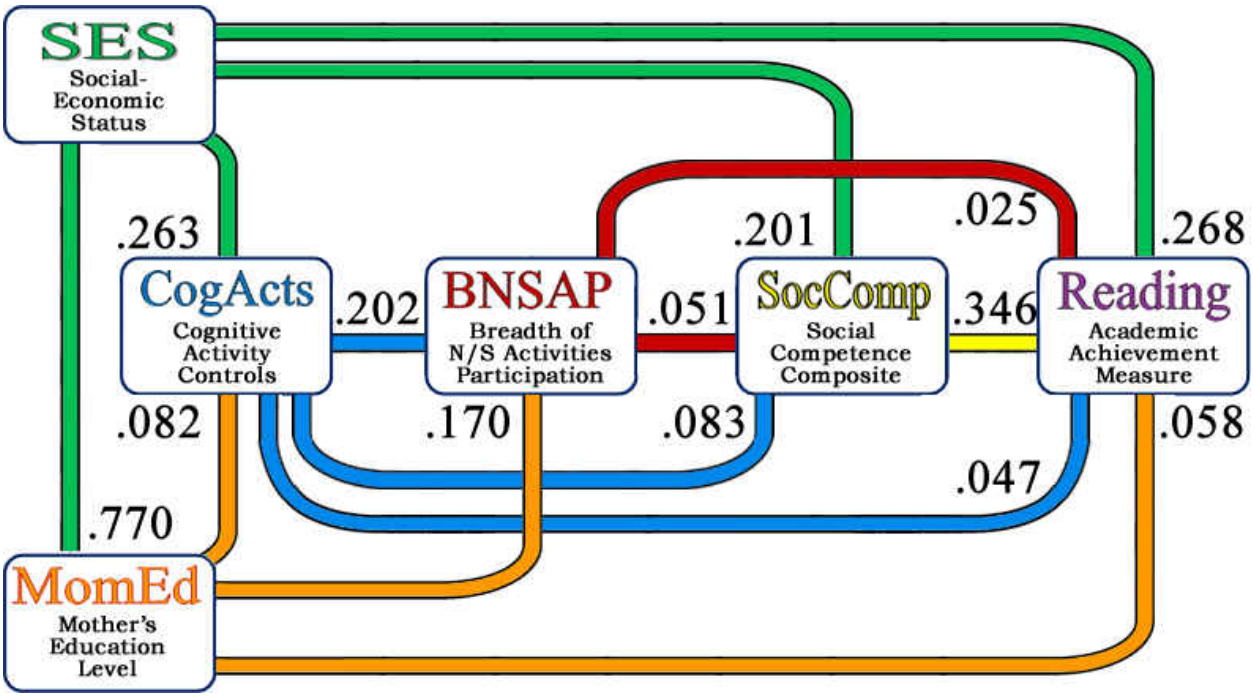


Figure 16: Model Analysis - Total Breadth (BNSAP) View

Tests of the Study's Main Hypotheses

Multiple regressions provided the data to confirm the model associations. Cluster variables established for the five model views (total, venue, impetus, involvement, and dendrogram) were used, in conjunction with gender, to create sub-sample iterations that generated the data results. Accordingly, (five models) x (NSAP/BNSAP) x (3 clusters + all students) represent 40 distinct theoretical model views. Therefore, for discussion of the main hypotheses below, the appendix data are succinctly excerpted into tables presenting only the significant associations pertinent to the hypothesis under discussion. This provides for a comparative view of the model associations relevant to the specific research question being tested. The significant standardized beta coefficients for the control variables (SESQ, MOMED, and COGNITIVE) are available in the appendices.

Effect of Social Competence on Academic Performance

Hypothesis 1

Student social competence (as measured by Teacher, Parent, and Student sub-scales composites) relates positively to student academic performance outcome (measured by Reading IRT scale score).

Finding:

The Pearson correlation coefficient between the social competence indexed factored composite and the reading IRT scale score was reported at r = 0.421. The 2-tailed significance was below the .01 level (p = .000). Referring to APPENDIX D, the beta coefficients of the model iterations ranged from .319 to .434 in the reading 3rd Grade regression models which included all other significant associations. When the 3rd Grade reading score is regressed solely on social competence ($F_{1,6237}=1410.263$, $p<.01$) the adjusted R^2 reports 18.4% of the variance in reading is predicted. Furthermore, in regressing reading on SESQ and social competence ($F_{2,6236}=1270.423$, $p<.01$), social competence accounts for an additional 11.8% over the .172 R^2 initiated by SESQ ($F_{1,6237}=1294.736$, $p<.01$). However SESQ adds only 10.5% more prediction of the reading variance to the model lead by the stronger predictor social competence. The hypothesis is firmly supported in that social competence accounts for a greater percentage of the 3rd Grade reading IRT scale score variance explained by the model than the percentage attributed to SES quintile.

Dimensions of Academic Performance

Review of the more detailed inferential results, wherein the alternate performance measures are shown with their social competence associations (*see* APPENDIX D) reveal several

important facts. The associations with the 3rd Grade reading IRT scale score are significant in every cell of the table. When the performance measure is reading change, the association strength is halved in the lower clusters (avg .204), reduced by almost two-thirds in the middle (avg .141) and total (avg .126) clusters, and are nearly non-existent among upper cluster samples (-.07 Total Boys and +.07 Dendro Girls).

Including the prior reading score in the regression shows how strong (from .577 to .669) a relationship exists between prior and current performance. Nevertheless, the social competence betas in the prior reading models are generally higher than those of the reading change approach, and were significant in every cell of the table. Interestingly, the middle cluster betas were higher than those in the lower cluster, and the upper cluster betas of the impetus, involvement and dendrogram models were higher than both lower clusters.

When the performance measures for percent change in reading and the reading change percentile via the cutlines were regressed the results told an entirely different story. Here, there were no significant associations reported for the lower cluster, and nearly none for the middle cluster boys. All of the significant betas that were identified were negative, with the strongest among the upper cluster results. The immediate interpretation is that higher performing students, because of their baseline, have the least gains by percentage.

Effect of Aggregate Scoring by Model

Hypothesis 2

Third grade non-school activity participation (NSAP) associates positively with student social competence composites.

Finding:

Table 15 – Significant Beta Coefficients: NSAP Associations with Social Competence

	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL												
TotalAP	0.023									0.079		
VENUE												
LessonsAP	0.046					0.078	0.068			0.075		
CommunityAP						-0.099						
FamilyAP							-0.042					
IMPETUS												
ExperienceAP										0.055		
TrainingAP	0.047			0.059						0.059		
RecreationAP	-0.028	-0.048						-0.055				
INVOLVEMENT												
ParticipateAP												
ObserveAP				0.067						0.078		0.090
DENDROGRAM												
LearningAP	0.069			0.064			0.064			0.134		0.083
PlayAP	-0.040						-0.045			-0.048		

Table 15 shows the significant standardized beta coefficients (APPENDIX F) where social competence was the dependent variable, suppressing predictor variables other than NSAP. The immediate impression is that social competence has positive associations in the upper cluster sub-sample under each of the model views. Significant positive betas are found for the total sample in the venue model LessonsAP category, the impetus model TrainingAP category, and in the LearningAP category of the dendrogram view. The LearningAP category reported significant betas in all all-students sub-samples, and the strongest association with social competence in the upper cluster. This all-students association was likely driven by the girls in the upper cluster, similar to that reported in the ObserveAP category of the involvement model. Girls in the lower cluster LessonsAP category of the venue model also showed significant positive association.

In the involvement model, ParticipateAP scores did not have significant associations with social competence for any subset of the sample. Also, the only significant betas identified for boys are in the middle cluster and all-students sub-samples of the RecreationAP category of the impetus model, and these associations were negative. In fact, all of the significant betas found for the CommunityAP, FamilyAP, and RecreationAP categories and the dendrogram view PlayAP activities were negative. The lower cluster girls in the CommunityAP category, although negative, was the second strongest (-.099) association between NSAP and social competence. Despite the model differences, because of the upper cluster results, the hypothesis is supported.

Hypothesis 3

Third grade NSAP associates positively with academic performance, as measured by Reading IRT scale score.

Finding:

Table 16 – Significant Beta Coefficients: NSAP Associations with Reading

	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL												
TotalAP	0.023		0.032	-0.036	-0.054		0.050		0.076			
VENUE												
LessonsAP	0.045	0.024	0.063				0.069		0.109	0.060	0.066	
CommunityAP										-0.040	-0.056	
FamilyAP	-0.026		-0.028	-0.052	-0.064							
IMPETUS												
ExperienceAP	-0.021			0.036								
TrainingAP	0.038		0.045				0.061		0.093	0.046		
RecreationAP										-0.041	-0.057	
INVOLVEMENT												
ParticipateAP	0.036		0.046				0.066	0.037	0.099			
ObserveAP	-0.024			-0.042	-0.062							
DENDROGRAM												
LearningAP	0.019		0.028				0.032		0.047			
PlayAP				-0.035			0.035		0.055			

Table 16 presents the significant standardized beta coefficients identified by the

regression model, including the 1st Grade reading IRT scale score, on subsamples by gender and demographic cluster. The findings of the analysis of NSAP associations with reading are mixed in that there are both positive and negative associations.

Although the CommunityAP and FamilyAP categories of the venue model and the impetus model RecreationAP category report negative associations, as with social competence, the significant betas noted for the ObserveAP category of activities are all negative with regard to reading. Most notable is that all of the lower cluster associations are negative and all middle cluster associations are positive. The mixed results reported in the upper cluster are consistent with the social competence report of positive associations for LessonsAP and TrainingAP activities. Positive betas for the ParticipateAP category of activities are indicated for all middle cluster sub-samples, as well as for all-students and for girls in the overall sample. However, the majority of the significant betas found among the sub-samples related to boys suggest negative associations. The hypothesis is supported.

Effect of Breadth of Activity Participation Scoring

The use of the diversity code simplified the scoring of the breadth of non-school activity participation (BNSAP). By definition, the range of BNSAP scores will be smaller than the range of NSAP scores, and could arguably result in less association strength. However, the ability of BNSAP scores to more accurately reflect the association, based upon the underlying range of activity participation contexts (Bohnert, Fredricks, & Randall, 2010), should yield stronger standardized beta coefficients. Results demonstrated that the BNSAP variables functioned well in assessing the different types of activity (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006) participated in by the sampled students. This is evidenced by the incidence of significant

BNSAP standardized beta coefficients noting stronger associations than those identified by NSAP.

Hypothesis 4

> Breadth of non-school activity participation (BNSAP) associates positively with student social competence composites, and, the strength of the association will be greater than that which exists between social competence and NSAP.

Finding:

Table 17 – Significant Beta Coefficients: BNSAP Associations with Social Competence

	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL												
TotalAP	0.051			0.097						0.105		
VENUE												
LessonsAP	0.055			0.080		0.121	0.064			0.071		
CommunityAP						-0.128						
FamilyAP												
IMPETUS												
ExperienceAP												
TrainingAP	0.042	0.038		0.083		0.087						
RecreationAP		-0.085			-0.082		0.039	-0.094		0.095		
INVOLVEMENT												
ParticipateAP	0.046			0.073						0.087		
ObserveAP						-0.080						
DENDROGRAM												
LearningAP	0.045						0.049			0.091		
PlayAP				0.074		0.083		-0.083				

Table 17 shows significant associations between BNSAP and social competence. More positive and fewer negative coefficients were identified using BNSAP than with NSAP. With the exception of the lower cluster CommunityAP activities, all of the negative associations were found with boys. All significant betas identified for girls appeared in the lower cluster, and were stronger than those found under NSAP. Whereas the dendrogram view PlayAP NSAP associations in the lower cluster were negative and those in the middle cluster were positive, the BNSAP associations were more strongly positive in the lower cluster and were negative for the middle cluster boys. It should also be noted that RecreationAP found positive overall associations in the middle and upper clusters. Although it may appear from

Table 17 that the -.094 RecreationAP beta for boys should have an offsetting positive beta for girls to yield the .039 beta for the cluster total sub-sample, APPENDIX F reveals that SESQ has a confounding influence on the girls which did not appear in the regression for the boys.

Hypothesis 5

BNSAP associates positively with academic performance, as measured by Reading IRT scale score, and, the strength of the association will be greater than that which exists between reading and NSAP.

Finding:

Table 18 shows the significant beta coefficients for BNSAP associations with reading performance. No significant betas were identified for the girls in the lower cluster, and none were identified for CommunityAP activities or the dendrogram view PlayAP category. As with the NSAP-reading analysis, all lower cluster associations are negative and all middle cluster associations are positive. There were fewer negative associations with BNSAP than with NSAP, and except for the above-mentioned categories, all positive associations noted for NSAP were positive using BNSAP. Additional positive betas were found with total activity for all students and middle cluster boys, with LessonsAP and TrainingAP for upper cluster girls, and with all boys in the ParticipateAP category.

Table 18 – Significant Beta Coefficients: BNSAP Associations with Reading

	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL												
TotalAP	0.025		0.033				0.046	0.038	0.054			
VENUE												
LessonsAP	0.045	0.032	0.059				0.062		0.090	0.052	0.052	0.066
CommunityAP												
FamilyAP				-0.042	-0.058							
IMPETUS												
ExperienceAP	-0.019			-0.035								
TrainingAP	0.034		0.038		-0.050		0.045		0.065	0.061		0.083
RecreationAP										-0.039		-0.060
INVOLVEMENT												
ParticipateAP	0.026	0.024	0.031				0.057	0.045	0.070			
ObserveAP				-0.038								
DENDROGRAM												
LearningAP	0.020		0.030		-0.048		0.039		0.052			
PlayAP												

`

The strength of the associations continues, as with all of the results presented, to be higher within the cluster sub-samples than those of the overall sample, though not necessarily ascending by cluster. Although the differences in the strength of the NSAP and the BNSAP associations with reading are nominal the hypothesis is supported.

Effect of Controls on Regression Models

Table 19 offers a final regression of the aggregate activity scores for reading and social competence. The values on the left are the change in R^2 in a regression of reading after social competence, then the SES quintile rank, or from a regression of social competence after entering the SES quintile. The values on the right represent the results from direct regression of reading on the aggregate score, and direct regression of social competence on the aggregate score. At the bottom left the other demographic and cognitive control results from similar regressions are included for comparison. It should be observed that the values are nominal for aggregate scores as the third predictor (behind social competence and SESQ) of reading, but no less significant

than MOMED. Similarly, the values are nominal for the aggregate scores as the second predictor (behind SESQ) of social competence, but no less significant than MOMED or RACE.

Table 19 – Reading and Social Competence Regressed on Activity

	R Square Change					R Square			
	C5R3RSCL Competence, SESQ5		CompetenceIF SESQ5			Direct Regression Reading IRT Scale		Social Competence	
Model	NSAP	BNSAP	NSAP	BNSAP	Aggregate Score	NSAP	BNSAP	NSAP	BNSAP
Total	0.001	0.002	0.002	0.004	TotalAP	0.037	0.029	0.016	0.016
Venue	0.007	0.007	0.004	0.005	FamilyAP	0.005	0.006	0.006	0.007
					CommunityAP	0.019	0.017	0.003	0.004
					LessonsAP	0.050	0.049	0.020	0.020
Impetus	0.003	0.002	0.004	0.004	RecreationAP	0.008	0.002	0.002	0.005
					TrainingAP	0.038	0.030	0.017	0.015
					ExperienceAP	0.016	0.016	0.009	0.008
Involvement	0.004	0.002	0.002	0.005	ObserveAP	0.008	0.015	0.007	0.009
					ParticipateAP	0.039	0.024	0.014	0.013
Dendrogram	0.001	0.002	0.006	0.004	LearningAP	0.031	0.029	0.019	0.015
					PlayAP	0.014	0.006	0.003	0.004
Race	0.008		0.000						
MomEdLvl	0.002		0.000						
Cognitive	0.003		0.008						

Effect of Cognitive Activity Participation

Table 20 shows the combined model views of all of the activity variables. The cognitive composite never identifies significant associations with reading in the middle cluster sub-samples, nor in the girls only sub-samples of the lower or upper clusters. For all of the five model views the cognitive composite shows significant associations with social competence in all except the girls-only sub-samples of the middle cluster. No activity category associations with reading were found for girls-only iterations in the lower cluster or for the girls-only NSAP execution in the upper cluster. Interestingly, girls-only activity category associations with social competence were only found in the lower cluster and in NSAP execution for the upper cluster.

Table 20 – Excerpted Standardized Beta Coefficients of Activity Variables

Dependent Variable -		Overall Sample						Lower Cluster						Medium Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
READING																									
TotalAP	TOTAL	.023	.025			.063	.049	.049	.053			.097	.093		.036							-.097			
C5COGNITIVE	TOTAL	.048	.047	.062	.062		.032	.064	.065	.079	.079									.053	.053	.123	.101		
SOCIAL COMPETENCE																									
TotalAP	TOTAL	.029	.051						.058											.083	.079			.098	
C5COGNITIVE	TOTAL	.087	.083	.122	.122	.058	.058	.111	.100	.174	.174			.079	.079	.087	.087	.058	.058	.048	.050	.070	.070		
READING																									
LessonsAP	VENUE	.061	.080		.052	.114	.102		.051			.071	.105	.095	.098		.079	.126	.093	.081	.092	.059	.093	.074	.067
CommunityAP	VENUE	.025	-.036					.092	.068			.120	.091	-.070		.061				-.047	-.057	-.075	-.094		
FamilyAP	VENUE	-.053		-.039	-.050	-.052									-.065	-.072	-.097	-.060		-.052		-.056			
C5COGNITIVE	VENUE	.056	.049	.080	.065	.045		.061	.057	.078	.078									.064	.052	.104	.087		
SOCIAL COMPETENCE																									
LessonsAP	VENUE	.049	.056																	.101	.090			.144	.092
CommunityAP	VENUE																							-.080	
FamilyAP	VENUE																								
C5COGNITIVE	VENUE	.088	.086	.110	.110	.043	.043	.105	.105	.158	.158			.068	.068	.096	.096			.073	.074	.079	.079	.083	.081
READING																									
ExperienceAP	IMPETUS	-.030	-.030											-.049	-.047			-.057	-.057						
TrainingAP	IMPETUS	.046	.040			.068	.050						.067	.079	.069			.119	.085	.059	.065		.078		
RecreationAP	IMPETUS							.078	.045	.060	.058	.107					-.052			-.084	-.082	-.100	-.086		-.083
C5COGNITIVE	IMPETUS	.050	.050	.070	.070	.033	.034	.066	.073	.082	.086									.060	.056	.109	.091		
SOCIAL COMPETENCE																									
ExperienceAP	IMPETUS			.038	.035												.066								
TrainingAP	IMPETUS	.040	.042																	.089	.055			.106	
RecreationAP	IMPETUS			-.050	-.079						-.060						-.127				.055			-.084	
C5COGNITIVE	IMPETUS	.088	.086	.119	.118	.043	.043	.105	.105	.157	.154			.054	.054	.070	.063			.114	.114	.131	.131	.123	.133
READING																									
ParticipateAP	INVOLVEMENT	.056	.030			.087	.044	.045				.059		.097	.046			.142	.062						
ObserveAP	INVOLVEMENT	-.042		-.043		-.034		-.044		-.060				-.049				-.052							
C5COGNITIVE	INVOLVEMENT	.052	.049	.071	.062	.033	.034	.081	.081	.099	.085	.059	.070									.068	.068		
SOCIAL COMPETENCE																									
ParticipateAP	INVOLVEMENT		.040						.051								-.062			.053	.069				
ObserveAP	INVOLVEMENT		.028		.036												.083			.055					
C5COGNITIVE	INVOLVEMENT	.094	.082	.122	.115	.058	.058	.116	.107	.201	.201			.053	.053					.094	.100	.093	.093	.140	.140
READING																									
LearningAP	DENDROGRAM	.026	.030			.039	.052	.046	.038			.097	.104								.049				
PlayAP	DENDROGRAM					.042												.062		-.051		-.076			
C5COGNITIVE	DENDROGRAM	.050	.049	.062	.062		.034	.071	.071	.083	.083			.036	.036							.076	.063		
SOCIAL COMPETENCE																									
LearningAP	DENDROGRAM	.070	.046									-.091	-.091	.066	.044					.134	.094			.121	.082
PlayAP	DENDROGRAM	-.034							.071			.090	.115	-.041			-.067								
C5COGNITIVE	DENDROGRAM	.091	.087	.122	.122	.058	.058	.110	.094	.164	.164			.054	.050	.079	.090			.092	.098	.092	.092	.120	.128

Significant betas are identified between activity category and reading sporadically throughout the boys-only iterations. However, they are all negative in the lower cluster, positive in the middle cluster, and mixed but of greater strength in the upper cluster. No associations were found between activity category and social competence in the upper cluster, or from the lower cluster NSAP execution. TrainingAP activities for all-boys was the single positive association with social competence, and the RecreationAP and dendrogram view PlayAP activities were the only other categories where betas were identified for boys-only.

The betas for cognitive activities are higher when in the social competence models than in the reading models (where social competence is also a predictor). The cognitive activity associations with reading are higher in the lower cluster than those identified for the model activity categories. Except for all-girls BNSAP LessonsAP and CommunityAP, the same holds for the associations with social competence. Of course there were no reported middle cluster reading associations, but where both model category and cognitive associations were identified in the middle cluster, results as to the stronger associations are mixed. All student LessonsAP, the dendrogram LearningAP activities, as well as the middle cluster negative boys-only BNSAP associations are stronger than the cognitive activities composite betas. The upper cluster comparison is balanced as model categories show stronger associations with social competence while the cognitive composite yields more of the stronger reading associations. With an average beta > 0.083, the use of this composite appears an effective control for interpreting non-school activity participation.

CHAPTER FIVE - SUMMARY AND CONCLUSIONS

Introduction

The underlying assumption of activity participation research is that there are gains to be predicted in social functioning. Social competence, by whatever definition, is a measure of the attributes of social functioning, whether in manifested behaviors (Junttila, Voeten, Kaukiainen, & Vauras, 2006; *cf*. Bukowski, 2003), peer relationships (Vaughn, McIntosh, & Hogan, 1990; Caldwell & Pianta, 1991), or academic adjustment (Walker, Irvin, Noell, & Singer, 1992). With student information from a nationally representative database, this research sought to confirm prior findings of associations between social competence and academic performance. This aim of the study was assisted by combining peer comparisons, social ratings, and student self-reflections into a composite that was used as the pivotal measure in the analysis of the relationship between activities and performance. The use of multiple source measures, to derive the social competence composite, served to reduce the biases that would otherwise inflate the associations (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000). Furthermore, implementation of a factor loaded and indexed composite construction resulted in a robust measure of social competence. Indeed, findings confirmed prior research showing social competence to hold strong associations with academic performance – measured in the present study using reading IRT scale score.

Additionally, the study set out to affirm the continued viability of the use of the EAP metric, wherein aggregate scoring of activity participation indicators offers a legitimate independent variable for investigating associations with outcome measures. Three models, informed by prior research, provided alternative aggregations of the activity indicators. These were combined with a cluster-analytically-derived control model and a total activity model for five views of the data. Analysis was conducted on participation count totals (NSAP) and breadth of participation scores (BNSAP) against sub-samples selected by demographic cluster and by gender. As noted in the review of the literature (CHAPTER TWO), prior studies often make connections between categorical demographic variables and EAP scores. This study has not only controlled for gender, socioeconomic quintile (SESQ), mother's education level (MOMED) and race, but via cluster analysis has superimposed these variables upon the design of all analyses. The study found that, after controlling for potentially confounding cognitive activities and prior reading performance, NSAP and BNSAP aggregate scores registered significant associations representing contributions to the accounting for the variance exhibited in social competence and 3rd Grade reading IRT scale scores. Not only the incidences, but the strength of significant associations invariably increased as the investigations move from the total sample to the gender/cluster sub-samples.

Discussion

Tests of the Study's Main Hypotheses

The results of the study found that social competence holds significant associations with academic performance as measured by 3rd Grade reading IRT scale scores. Second, the EAP

metric demonstrated that aggregate scoring continues to effectively account for variances in student outcome measures. Third, by coding activity participation indicators for diversity, the breadth of non-school activity participation (BNSAP) scores predicted associations between diverse activity participation and the dependent variables.

Effect of Social Competence on Academic Performance

Social Competence Quantitative Effect

Separate components of social competence (*e.g.* social responsibility, peer relationship, and self-regulatory) were not analyzed separately for their influence on academic achievement as in Wentzel (1991). However, the correlation results from parent, teacher and student sub-scale composites showed similar associations with academic outcomes. Each sub-scale composite was found to relate significantly to reading IRT scale score. The inferential findings are consistent with those of other researchers wherein social competence significantly and robustly associates with the academic measures used in the studies (*e.g.* Welsh, Parke, Widaman, & O'Neil, 2001), even when controlling for prior academic achievement (*e.g.* Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000).

The factor loaded and indexed social competence composites, as constructed for this study, hold promise for replicating several of the longitudinal studies discussed in the literature review using a nationally representative database like the ECLS-K. For example, the reciprocal relationship, observed by Welsh, Parke, Widaman, and O'Neil (2001), between social and academic competence can be investigated by constructing composites for each round of data collection. Coincidentally, the social competence related variables available in the ECLS-K are different at each grade level. This is consistent with the assertion by Vaughn, Azria, Krzysik,

Caya, Bost, Newell, et. al. (2000) that the definition of social competence will vary over time. Moreover, indexed composites would serve as reliable repeated measures. This not only facilitates measurement of social competence improvement, but calculating social competence means within school class could provide a vehicle for testing school-level influences (*see* Hoglund & Leadbeater, 2004, Brophy-Herb, Lee, Nievor, & Stollack, 2007). It would be difficult to overstate the methodological benefit of having a robust social competence composite.

Social Competence Qualitative Effect

Prior researchers have attributed the impact of social competence on academic achievement to prosocial behaviors (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000), aggressive or coercive notwithstanding. The social competence composite constructed for the present study represents an index of prosocial components or measures. As such, the present findings support both the argument that high prosocialness contributes to academic achievement and that low prosocialness undermines academics and correlates with lower performance levels.

Another common thread in the literature places peer-triggered student self-regulation (Wentzel, 1991) at the heart of prosocial development. Welsh, Parke, Widaman, and O'Neil (2001) demonstrated that while student academic competency influenced social acceptance and behaviors in the first years of elementary school, social competence began influencing academics by the third grade. The present study's cross-sectional analysis of third grade students also showed reciprocal associations between social competence and reading achievement, but unlike Welsh, Parke, Widaman, and O'Neil, here reading predicted social competence with higher standardized beta coefficients than those wherein social competence predicted reading. This contrary finding, in addition to the inability to make any causal statements from cross-sectional

analysis, should caution against, or mitigate any, inferences regarding the directional strength of reciprocal associations.

Effect of Activity Participation on Social Competence

Positing social competence as the mediator of activity participation's association with performance measures is founded upon prior research noting the important role that interactions play in social development. Grant and Haynes (1995) approached navigating these interactions as a skill to be learned by students. Contextual perceptions and judgments of the interactions (Malloy, Sugarman, Montvilo, & Ben-Zeev, 1995) can determine the course of student attempts at self-regulation (Wentzel, 1991). The developmental benefits of social interactions are not only the successful negotiation of peer group dynamics, but reinforced awareness of adult/teacher expectations (Blankemeyer, Flannery, & Vazsonyi, 2002), exposure to the risks/rewards of the rationale of academics (academic adjustment) and overall social competence.

As expected, from studies on structured vs. unstructured activities going back to Mahoney (2000), significant positive beta associations were found between activity participation (NSAP and BNSAP) and social competence in the cognitive activity categories (*i.e.* venue: LessonsAP, impetus: TrainingAP, and dendrogram: LearningAP). These results appear in-total and across clusters without favoring (*i.e.* increasing/decreasing) upper or lower cluster students. However, when it is observed that the involvement model ParticipateAP category has significant beta associations with BNSAP, but none appear with NSAP, it can be argued that diverse interaction venues promote social competence in a manner similar to participation in structured activities. This suggests that unstructured activities can also stimulate social growth when it is not simply participation in many activities, but the variety of interactions experienced.

Effect of Activity Participation on Academic Performance

The social interactions inherent in activity participation facilitate academic performance via cognitive (Rimm-Kaufman & Chiu, 2007), in conjunction with the behavioral (Walker, Irvin, Noell, & Singer,1992) dimensions of social competence. Comprehension of the teacher-child relationship (Blankemeyer, Flannery, & Vazsonyi, 2002) and classroom/group dynamics (Brophy-Herb, Lee, Nievor, & Stollack, 2007) contribute to student adjustment to schooling.

The mixed results by gender from the demographic cluster sub-samples are consistent with findings from studies attentive to at-risk or marginal vs. competent students (*e.g.* Gerber, 1996; Lisella & Serwatka, 1996; Mahoney & Cairns, 1997). For girls, the associations with reading are strong in the total and middle clusters. This is relatively consistent with results attributing higher participation by girls with yielding higher achievement (Lisella & Serwatka). That all significant associations identified for lower-cluster boys were negative, although at-risk but not specifically minority herein, supports findings by Lisella and Serwatka, that academic achievement for these students is not benefited by activity participation. The findings of negative NSAP associations with reading for upper cluster boys, in the CommunityAP and RecreationAP categories, follow the arguments for diversion or distraction (Coleman, 1960; *cf.* Mahoney & Cairns, 1997) and detriment to identity and context (Guest & Schneider, 2003).

All lower-cluster reading associations are negative and primarily indicated for boys. This would appear to be in direct contrast to the findings by Dumais (2006). However, Dumais did not use aggregated scoring, rather, investigated interaction with six specific variables. Accordingly, without disputing the findings in Dumais, the present data would support social reproduction (Bourdieu, 1973) influencing the negative associations with reading found among lower-cluster

boy students. This is also indicated by the fact that the only positive associations for boys were in the upper cluster venue: LearningAP (where the participation rationale would likely have been stressed by parents) and in the middle cluster observe: ParticipateAP (where participation would be without frustration or pressure, only a rite of youth) categories. This does not foreclose the applicability of the cultural mobility model (DiMaggio, 1982) to the largely positive associations observed across clusters and outcomes for girls.

Inasmuch as this study uses the same dataset (ECLS-K 3rd Grade students), results regarding progression of participation through demographic clusters are consistent with Covay and Carbonaro (2010). However, the present study makes no causative inference about the "effects" of the studied activities. It is sufficient to note that the identified associations, whether correlational or inferential (*see* Marsh, 1992), are strong enough to justify further investigation.

Effect of Breadth of Activity Participation Scoring

The primary reason for employing breadth of activity participation analysis is to assess the different activity contexts or domains in which a youth is involved (Bohnert, Fredricks, & Randall, 2010). Although NSAP scores represent increases in student exposure to adults, peers, and extracurricular experiences that enhance development, BNSAP scores filter activities which represent 'more of the same' and attempt to gauge occurrences of different activity content, interactions, or skillsets (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006). Conceptually distinct activity types (Simpkins, Eccles & Becnel, 2008) were originally grounded in theory then refined by empirical evidence. The use of the diversity code facilitated scoring the activity indicators into category BNSAP scale variables. Multiple regression processing of iterations by model, cluster, and gender identified significant standardized beta coefficients which were used

for comparative analysis of variance explained. The low, medium, and high levels of participation, corresponding to the lower, middle, and upper cluster means, resulted in mixed findings for the various sub-samples.

For both the social competence and reading regression models, BNSAP scores yielded more significant positive associations and fewer negative associations than had been identified with NSAP. This is particularly relevant because the clustered sub-samples under analysis are controlled for demographic, cognitive, and prior performance influences that would otherwise confound the results. Whether BNSAP or NSAP associations were stronger depended upon the sub-sample. However, in the present study, the incidences of associations were as important as the strength of the associations, since they speak to the viability of the independent variables as predictors in various contexts.

Additional Observations from Study Results

Evidence, that activity participation enhances student social skills and thereafter academic performance, must overcome the challenges presented by confounding variables and other influences. The combined cluster and multiple regression processes employed by the study brought demographic, cognitive, and prior performance controls to bear on the interpretation of the results. In addition to answering the research questions of the study, several other relevant observations were made. First, the confounding influence of prior academic performance was tested via several dimensions of reading performance. Second, the persistent significance of the cognitive composite makes it deserving of special discussion. Third, the results from the nodes

proceeding up to and including the primary independent variables (*i.e.* activity scores) provide for an interesting take on student self-selection.

Effect of Performance Measure Alternatives

Results from the current study confirm findings of other researchers that prior academic performance offers the strongest associations with school performance (Rimm-Kaufman & Chiu, 2007). This research followed the approach taken in the cross-sectional study by Covay and Carbonaro (2010) of including the 1st Grade reading IRT scale score in the multiple regressions to control for prior performance. Although more distant performance scores (3rd to 8th Grade) were found to have lost their relevance (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000), these results proved to be robust and were preferred because of the parallel nature of the IRT scaled performance measure in the two scores.

The following alternative reading performance measures were processed in the study:

1) the 3rd Grade reading IRT scale score (without considering a baseline performance)
2) the change from the 1st Grade to the 3rd Grade reading score
3) the percentage improvement in the change from the 1st Grade to the 3rd Grade, and
4) the cutline percentile (1 – 10) for equal blocks of cases by improvement percentage.

The Dimensions of Academic Performance section, under the discussion of hypothesis 1, reports the efficacy of using each of these performance alternatives for interpreting associations between reading and social competence. Each reveals interesting information when processed through the various analyses of the study. In addition, the significant associations identified between activity participation and the alternative reading performance measures are presented in a comparative table in APPENDIX E.

Effect of Cognitive Activity Participation

A cognitive composite was included to isolate participation in activities (reading to child, library visits, and computer access) which were aligned with, and therefore more likely to impact, reading abilities. This was an effort to preserve integrity of the study's results, in the same way that demographic variables are controlled for. Legitimately, the cognitive activities could have represented just another category among the aggregation models. Less appropriately, the constituent variables could have been directed into the other categories as deemed relevant. The results from the study suggest that processing the composite outside the activity aggregation scores made the activity models more informative, while affirming the confounding significance of the cognitive activities (average beta > 0.083).

One curious result of the study is that activity category girls-only associations with social competence were only found in the clusters where girls-only activity category associations with reading were not found. Also, in the all-girls iterations, the total activity, lessons and training associations were stronger than the betas for the cognitive composite. These results would suggest that although earlier school-related vs. non-school or community results (Gerber, 1996; Lisella & Sewartka, 1996) are indicated by the cognitive composite associations, the metrics of EAP research are aptly applied via NSAP and BNSAP.

Effect of Self-Selection on Activity Participation

Activity selection and activity participation are integrated processes for which separating the selection from the participation influence would be difficult, and possibly inappropriate (Eccles, 2005). In the current study, self-selection concerns arise when data in regression levels at or before the activity scoring variables are reviewed (*see* APPENDIX G). Despite the absence

of an indication of multicollinearity by the bivariate correlations, the strongest associations with any of the researcher model activity category variables is one of the other activity variables in the model. Lisella and Serwatka (1996) had asked if students of particular achievement were attracted to certain activities. In the dendrogram model view the only stronger associations than those of the alternative activity aggregate scores are registered by the cognitive composite. Of the remaining models, the other category activity scores are associations with the dependent aggregate score at two to four times the beta value of either MOMED or SESQ. This speaks to something beyond proclivity or interest (Posner & Vandell, 1999) or skill set or competency (Lisella & Serwatka, 1996), given the consistency of activity participation ratios across model categories. These correlations would indicate that activities are being selected in conjunction with, rather than as opposed to, other activities.

This does not demand that self-selection undermines meaningful interpretation of activity participation (*see* Larson, 2000). Although fixed effects models were employed as an early strategy to mitigate the influence of self-selection, person-centered approaches have emerged in recent studies (*e.g.* Darling, 2005). One attempt at controlling for individual selection factors in the present study was through the use of mutually exclusive activities among model categories; another was controlling for prior performance which contributes to mediating the "particular achievement" aspect of self-selection (*see* Covay & Carbonaro, 2010). Similarly, researchers in longitudinal studies have used the variation in year-to-year participation in activities as a covariant to control for self-selection (*e.g.* Darling, 2005; Simpkins, Eccles & Becnel, 2008). The extant literature has not offered hope or direction for resolving self-selection concerns by a cross-sectional study. However, many significant associations have been identified in this study,

and there is sufficient variety in the obtained results to support independence. Nevertheless, other potential contextual selection challenges often exist (*see* Simpkins, Eccles, & Becnel, 2008). A study that specifically addresses self-selection would appropriately bridge a gap in the activity participation research.

Effect of Aggregate Scoring by Model

The EAP metric of aggregate scoring of a count variable was enhanced by multiple aggregation models. The results, which would otherwise have been only nominally significant, identified stronger associations when presented for gender and demographic iterations of cluster sub-samples. Also, in addition to the distinctions made apparent by category assignments within the models, the ability to manipulate the models by shifting variables between categories and/or diversity groups provided further improvement for interpreting differential associations with the activity participated in.

It should be noted that Marsh's (1992) "intervention perspective" was as opposed to a "variance explained perspective" as would be assessed by multiple regression analysis. In the present study, activity participant vs. non-participant results are not available. However, the inferential statistics assume a linear relationship between the activities and outcome measures, without having conducted a curvilinear investigation of any drop-off at higher participation levels (Powell, Peet, & Peet, 2002).

The Beneficial Use of the Count Variable

The summing of dichotomous activity participation variables has been a consistent metric applied in EAP research (*e.g.* Simpkins, Eccles, & Becnel, 2008), though not without expressed concerns and objections. Roth, Malone, and Brooks-Gunn (2010) called for activity participation

researchers "to move beyond the simplistic yes–no distinction to investigate more nuanced questions of participation" (p. 311). Arguing against more nuanced investigations would be irrational, and it is seemingly unsupportable to disdain the use of a count variable because it is dichotomously derived. It is without dispute that "Not all extracurricular involvement is equal" (Barber, Stone, & Eccles, 2003). However, the present study demonstrates that a study's design can be enhanced by refining the variable selection process and the study aggregates through preliminary analysis of activity counts. Fredricks and Eccles (2006) identified several nuanced alternatives to total aggregated dichotomous indicators, suggesting the need to examine simultaneous participation in a range of activities. This notion, of investigating activity range, addresses not only breadth of participation, but multiple activity participation as well.

Very few studies have singularly evaluated alternative aggregations of the same data (*e.g*. Barber, Stone, & Eccles, 2003; Fredricks & Eccles, 2006). Findings show patterns in the betas of the LessonsAP, TrainingAP, and dendrogram LearningAP categories that reflect change in association strength by the juxtaposition of certain variables. This is on par with the call by Eccles (2005) to identify differential associations for different varieties of activities by different clusters of students. This is precisely the instance where a count study is the appropriate process for such quantitative analysis (*see* MacCallum, Zhang, Preacher, & Rucker, 2002; Bohnert, Fredricks, & Randall, 2010).

Limitations

Although the study has identified significant associations between activity participation, social competence and academic performance as measured by reading, several limitations are apparent and must be addressed in future inquiries.

1. Although all relevant variables within the ECLS-K public-use data set were included in constructing the social competence composites and aggregating the activity participation scores, the study was limited to available variables. As with the decision to assign certain variables to the cognitive composite control, activities not queried in the ECLS-K surveys could have substantial effects upon the results obtained by a similar study.
2. An intervention perspective (*i.e.* comparing non-participants to students at various levels of NSAP) was not applied to the data in the present study. The linear progression of mean statistics through the cluster sub-samples was adequate for the present investigation but limited comparisons to many prior studies (*e.g.* Marsh 1992; Lisella & Serwatka, 1996).
3. The cross-sectional study is sufficient for investigating certain methodological constructs. However, the questions of development under study in activity participation research require benchmark measures which can localize participation. Such are best obtained through a longitudinal study. In the absence of these measures, correlations may be observed but attributions are unfounded.
4. The best practices strategy of using dispersion methods (Bohnert, Fredricks, & Randall, 2010) was determined to be beyond the scope of the present study design to demonstrate that results from multiple activity views can assist in refining aggregate models.

5. The reading IRT scale score is a solid indicator of a specific academic competency, but evaluation of other academic indicators (either separately or as composites) would enhance the ability to identify or characterize additional academics-associated beneficiaries of activity participation.
6. The simple summation of activity participation indicators may be inadequate for properly scoring activity participation aggregates. Activities assigned to an aggregate are not likely to contribute equally to the competency benefits to be gained by the child. As such, a weighted scoring algorithm should improve the associations strength of the aggregate score. Whether aggregate scoring could benefit from the factor loading approach taken in constructing the social competence composite is a legitimate future research question.
7. Because of the racially skewed sample, it is believed that race may have distorted the clustering and was therefore excluded from the cluster delineations. Race might best be examined in future studies like gender was in the present study (*i.e.* sub-sampled iterations; *see* Gerber, 1996).

Summary

This study has extended the research into activity participation and its contribution to social and academic competence in several significant ways. First, the study implemented the use of a factor loaded and indexed social competence composite that affirmed the contention that social competence promotes academic performance. Second, very few studies have evaluated alternative aggregations of the same data. This study offered three aggregation models and a hierarchical cluster analysis derived control model, in addition to a total activity model for five

views of the analysis results. Third, the data was processed as participation count totals (NSAP) as well as by distinct activity types (BNSAP). Fourth, the data was run through samples selected by clusters that were derived from demographic profiles. Fifth, sub-samples were thereafter processed by gender. And finally, selected cognitive activities were used to construct a composite which served as an additional control in the analysis.

Results demonstrated a logical distinction between boy and girl student activity participation as it contributed to the association strength of various scoring aggregates in different iterations. The girls-only sub-samples tend to drive the overall students associations with NSAP, whereas the boys-only sub-samples, nearly non-existent among significant NSAP associations, seemed to drive the direction and strength of BNSAP coefficients. Although beta values from the regressions in the total activity samples are nominal, such is not the case among the results from the cluster sub-samples. The use of the cluster distinctions provided views of significant associations that were otherwise dissolved into nominal aggregates.

Implications of Present Study

The quality of activity participation is of undisputed merit; however this study was designed to determine if the quantitative metric of EAP research remains a viable first inquiry in identifying social and academic associations with student participation. The results of such an inquiry are not intended to be conclusive, rather to inform the more detailed investigations which should follow.

Educational Implications

This exploratory investigation supports the research premise that associations between activity participation and performance indicate legitimate correlations. Notwithstanding the need for future inferential analyses, the gender findings suggest that girls might attain social and academic benefit from activity participation more consistently than boys. Negative associations tend to prevail in findings from boy sub-samples which could reflect a lack of perceived efficacy. Whether these benefits or perceptions accrue from cultural indoctrination or from relationships cultivated or encouraged by activity leaders is worthy of investigation.

Implications for Students

With the upper cluster students also registering the upper-grades, participation profiles could be regarded as best practices. Whether by venue, impetus or the statistical dendrogram view, the activities aggregated as lessons, training, or clubs consistently show positive associations with performance despite prior performance. This suggests that students benefit from activity participation because benefits are to be had. Therefore to the extent that students might model participating in quantity of activities like the upper cluster students, they may need to model the nature of that participation. In fact, the results of this study indicate that students in the upper-cluster could attain some social competence benefits by modeling aspects of the way that middle-cluster students participate in activities.

Implications for Parents

Although the cluster delineations primarily fall along lines of mother's education level and socioeconomic status, the data regarding the cognitive composite argues strongly for reading to the child, making library visits, and providing computer access. The first two of these are

within the reach of most parents, and the last must be given appropriate priority within the financial budget of any home with school-aged children. Additionally, the gender data suggests that for girls associations derive from participation in many activities (NSAP), whereas the associations identified for boys appear to be related to diverse activity participation (BNSAP). Obviously, children are best nurtured and developed by their individual interests. The data in the present study could very well simply indicate the acquiescence of parents to perceived norms of our society. Nevertheless, NSAP results in more associations indicated by the girl clusters and the significant associations with outcomes for boys appear most often by BNSAP.

Implications for Teachers

Despite the use of non-school activities in the study, the data provides useful information for teachers in their classrooms. Positive associations for ObserveAP category of activities reinforce the obvious advantages of class field trips. Similarly, the cognitive data proves that children are not averse to instruction and reiterates the importance of supplementing family reading, library visits, and computer access for students. It is not appropriate to presume the level of participation in these crucial activities. By subtle or direct means, teachers can solicit information regarding student outside activities, as a method of establishing common ground with students for reinforcing their supportive role as teacher. Also, because of the importance of the teacher-child relationship (Blankemeyer, Flannery, & Vazsonyi, 2002) and the classroom climate (Brophy-Herb, Lee, Nievor, & Stollack, 2007), teachers may use their knowledge of student activity participation to encourage related skills or social maturing objectives. Thus, the classroom ecology improves as the prosocialness of the individual students increases (Hoglund & Leadbeater, 2004) by informed and positive teacher responses and attitudes (Wentzel, 1991).

Implications for Researchers

The identification of the nature of participation by the various clusters highlights the need for more detailed corroborating variables in future studies. Inquiry should be undertaken into the factors (*e.g.* accessibility or affordability of the activities) which contribute to the participation distinctions observed across clusters. Such a study into cluster differences would benefit from data on parental influence in child activity participation decisions, including responses on parent knowledge or awareness of available activities, and parent attitude regarding participation in particular activities.

Results of the present study also offer several insights into methodological adjustments which can improve the robustness of activity participation findings. The multiple data views have demonstrated that activity aggregations are dependent upon the relevance of the constituent activities to the outcome measure. Determining the statistical relevance of the activities may be a necessary prerequisite to aggregate scoring. In addition to being responsible for striking the proper balance between the number of predictors and their predictive power (Lomax, 2001), the researcher needs to effectively array the activities into aggregates that best represent activity profiles able to communicate legitimate social or academic benefits. Identifying profiles must derive from both theory and empirical evidence. One example of such profile identification would be the prosocial class of activities introduced by Eccles and Barber (1999). In the effort to synthesize an ever-growing volume of influential activities it is incumbent upon researchers to maximize qualitative effectiveness through the use of effective quantitative studies.

Conclusion

Findings in the study, after controlling for demographic and cognitive variables, confirm prior activity participation research. Significant associations identified both positive and negative associations between NSAP/BNSAP scores and measures of social competence and reading performance. In addition, the multi-model iterative sub-sample approach, followed in evaluating the associations, provided insight into, and support for, many of the issues and concerns confronted by activity researchers for years. Even after controlling for significant demographic and other potentially confounding influences, interpreting the associations between activity participation and outcome measures remains a daunting task. However multifaceted or multidimensional the study design, some significant influences will always be relegated to unexplained variance. There exists a wealth of national longitudinal studies covering thousands of students over their entire student lifetime. Today's critical research questions could not have been built into the designs of those studies. The question remains for researchers, whether valuable determinations can be made from available data. The present findings, from *only* a cross-sectional study, demonstrate that the "simplistic" EAP metric remains a viable asset for the activity participation researcher. Study designs using existing databases can be improved by varying the activity variable mix and considering profiles of the students at different levels of participation. Stronger inferences will continue to only be justified in well-designed longitudinal studies (Marsh, 1992). And, it is possible that the self-selection objection can be addressed by a quantitative study, even in the absence of affect variables.

The goal of activity participation research is not to craft a justification for a philosophy of education; rather, it is towards drafting an explanation of the relationships which exist between

activities and outcomes. Demonstrating activity participation's contribution to social competence by associations with academic competence attempts to answer "Why should a benefit accrue to academic measures from activity participation?" The strength of beta coefficients found in activity participation research has not changed dramatically since Marsh's (1992) typically small, but consistently positive statistical findings. It is an awesome challenge to overcome the import of socioeconomic station (Farnen, 2007; *cf.* Bourdieu, 1973; and DiMaggio, 1982). However, maximizing benefit to students from our investment in their development should be the primary aspiration of all educational stakeholders.

Eccles (2005) suggested that basic descriptive work is (and I argue, will remain) a necessary first step for moving our understanding towards firm inferential conclusions. Comprehensive inquiries are nearly nonexistent, and we have barely scratched the surface in comprehending the ecological implications of student participation in activities outside of the curriculum. Resolving the process issue (Holland & Andre, 1987), of how activity participation contributes to performance gains, although ultimately will require focused qualitative studies, will continue to be guided by quantitative inquiries. Foreclosing the use of count variables for synthesizing the overwhelming abundance of associations seems counterproductive.

APPENDIX A
FACTOR LOADED COMPOSITE CONSTRUCTION

Constructing Social Competence Composite via Factor Loading

The construction of social competence composites began with principal component factor analysis of the social competence variables. Figure 17 illustrates that the 3rd Grade factors converged in five iterations into 5 components. Component 1 consisted of the teacher response variables. This was followed by the variables of the parent peer comparisons. The next component loaded on the class and schoolwork variables of the student self-description questionnaire. The fourth component was composed of the parent responses on how active the student was compared to other children, and during structured and unstructured play. And the final component included the student self-assessment on internalizing and externalizing behavior.

Principal Component Analysis
Rotated (Varimax with Kaiser Normalization)

KMO and Bartlett's Test					Communalities	Component Matrix (a)							Reliability
					Extraction	1	2	3	4	5	% of Variance	Cum Var %	Cronbach's Alpha
Kaiser-Meyer-Olkin Measure of Sampling	0.728	NO Cases Excluded	RT5SCINT	Teacher	0.947	0.966					21.413	21.413	0.912
Bartlett's Test of Sphericity			RT5CONTRO		0.858	0.921							
Approx. Chi-Square	144915.2		RT5INTERP		0.860	0.919							
df	190		RT5EXTERN		0.668	0.794							
Sig.	0.000		RT5LEARN		0.709	0.772							
			RT5INTERN		0.276	0.459							
a. Rotation converged in 5 iterations.			RP5S0LVE	Parent Skills	0.571		0.727				12.062	33.474	0.740
			RP5ATTENI		0.554		0.692						
			RP5PRONOU		0.441		0.656						
			RP5SAMEAG		0.445		0.647						
			RP5BEHAVE		0.412		0.611						
			RC5SDQSBC	Child Class	0.767			0.868			11.021	44.495	0.740
			RC5SDQMTC		0.500			0.703					
			RC5SDQRDC		0.476			0.672					
			RC5SDQPRC		0.461			0.657					
			RP5PHYACT	Parent Active	0.738				0.858		10.504	55.000	0.740
			RP5STRUCT		0.724				0.846				
			RP5ACTIVE		0.582				0.759				
			RC5SDQINT	Child Beh	0.820					0.885	7.928	**62.927**	0.739
			RC5SDQEXT		0.777					0.824			
											Unexplained Variance =	37.073	

Figure 17: Principal Component Analysis of Social Competence Variables

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy at 0.728 is sufficiently above the required minimum. Bartlett's Test of Sphericity p=0.000 soundly rejects the null-hypothesis that the correlation matrix is an identity matrix. Also, the cumulative % of variance at nearly 63% is also attractive. The Scale Reliability Analysis reported Cronbach's Alpha measures for the five component groupings at .739 and above, which is also good.

The focus in constructing the social competence composite via the factor loadings was to provide for weighted variable contributions in an effort to preserve the legitimacy of the composite across the nearly 9000 student cases. Figure 18 represents a marked up table of the calculations used by this study.

Principal Component Analysis
Rotated (Varimax with Kaiser Normalization)

			Communalities	Component Matrix (a)					% of Variance	Cum Var %	% of CumVar	Sum of Loadings	% of Load	v	cumulative max	% of CumMax	recoding mult	recoded var max	variable val mult
			Extraction	1	2	3	4	5											
NO Cases Excluded	RT5SCINT	Teacher	0.947	0.966					21.413	21.413	0.3403	4.832	0.1999	4	24	0.3077	1.1059	5.3063	1.3266
	RT5CONTRO		0.858	0.921									0.1906	4				5.0575	1.2644
	RT5INTERP		0.860	0.919									0.1902	4				5.0490	1.2623
	RT5EXTERN		0.668	0.794									0.1644	4				4.3637	1.0909
	RT5LEARN		0.709	0.772									0.1598	4				4.2411	1.0603
	RT5INTERN		0.276	0.459									0.0951	4				2.5238	0.6310
	RP5S0LVE	Parent Skills	0.571		0.727				12.062	33.474	0.1917	3.334	0.2181	4	20	0.2564	0.7476	3.2602	0.8150
	RP5ATTENI		0.554		0.692								0.2075	4				3.1026	0.7757
	RP5PRONOU		0.441		0.656								0.1969	4				2.9443	0.7361
	RP5SAMEAG		0.445		0.647								0.1942	4				2.9030	0.7257
	RP5BEHAVE		0.412		0.611								0.1833	4				2.7410	0.6852
	RC5SDQSBC	Child Class	0.767			0.868			11.021	44.495	0.1751	2.900	0.2995	4	16	0.2051	0.8538	4.0913	1.0228
	RC5SDQMTC		0.500			0.703							0.2423	4				3.3099	0.8275
	RC5SDQPRC		0.476			0.672							0.2316	4				3.1637	0.7909
	RC5SDQPRC		0.461			0.657							0.2266	4				3.0956	0.7739
	RP5PHYACT	Parent Activ	0.738				0.858		10.504	55.000	0.1669	2.462	0.3483	3	10	0.1282	1.3020	4.5356	1.5119
	RP5STRUCT		0.724				0.846						0.3434	3				4.4711	1.4904
	RP5ACTIVE		0.582				0.759						0.3083	4				4.0137	1.0034
	RC5SDQINT	Child Beh	0.820					0.885	7.928	62.927	0.1260	1.709	0.5178	4	8	0.1026	1.2283	5.0884	1.2721
	RC5SDQEXT		0.777					0.824					0.4822	4				4.7382	1.1845
							Unexplained Variance =			37.073	100%				78	= CumMax	Compete Floor =		45.953

Figure 18: Calculation of Composite Component Variable Value Multipliers

The '% of TotVar' column of Figure 18, allows for ignoring the unexplained variance during the interim calculations. However, the unexplained variance can be incorporated later in the composite construction, as will be explained below. Component percentage of the total

variance explained results from dividing the '% of Variance' (V_c) by the (62.927%) total variance explained by the five components (V_5).

$$V_c = \frac{l_{ci}}{\sum_{n=1}^{5} V_n}$$

(A1.1)

The factor loadings from the component matrix (l_{ci}) are used to project the relative contribution of the component variables. First, a sum of the loadings (L_c) of the variables within each component is calculated.

$$L_c = \sum_{i=1}^{k_c} l_{ci}$$

(A1.2)

Next, a factor loading percentage (F_{ci}) is calculated by dividing each variable's loading by the sum of the loadings (L_c) within the component.

$$F_{ci} = \frac{l_{ci}}{L_c}$$

(A1.3)

For the first component made up of teacher variables Self-Control, Interpersonal Behavior, Externalizing Behaviors, Approaches to Learning, and Internalizing Behaviors the loading ratios are 19.99%, 19.06%, 19.02%, 16.44%, 15.98%, and 9.51 % respectively. Note, the suppressed lower loading absolute values of the noncomponent variables would affect the

absolute variable strength as it relates to the component loadings. But for our purposes, in composite construction, we are calculating contribution of the variable relative to the other determined component variables.

Before applying the variable distributions to a composite calculation the raw values of the variables must be reviewed for their contribution effect. The level of physical activity during Free Time (P5PhyAct) and Structured Play (P5Struct) are the only variables with maximum values of 3. All other variables range from 1 to 4. Representation of the variable maximum values (v_{ci}) distribution in Figure 19 gives us an idea of the effect of simply summing the variables. However, by a visual comparison to the earlier component contribution to explained variance, it is apparent that a simple sum will not properly represent the components.

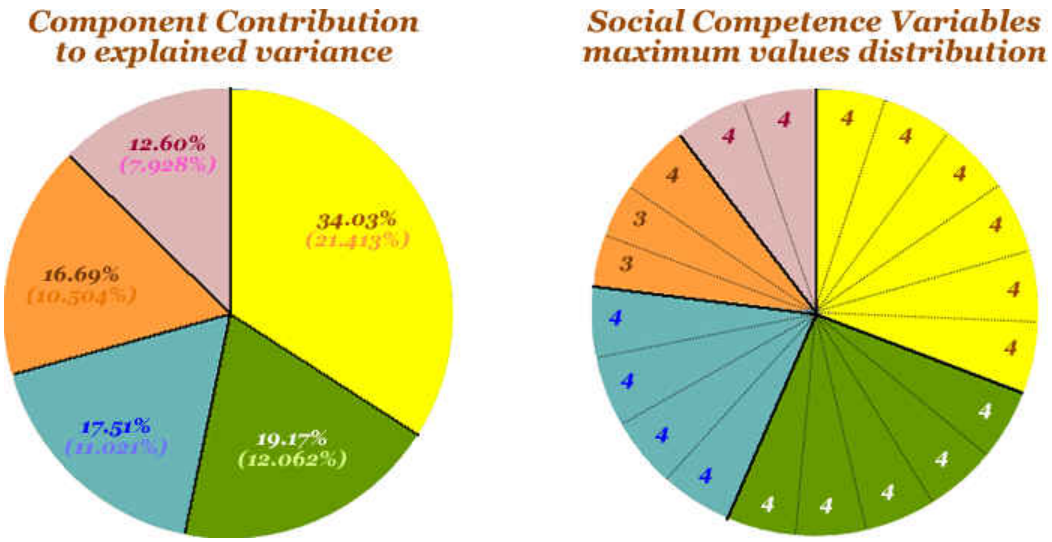


Figure 19: Social Competence Component Explained Variance Contribution vs. Variable Maximum Values Distribution

The corresponding component percentages would be 30.8% (24/78), 25.6% (20/78), 20.5% (16/78), 12.8% (10/78), and 10.3% (8/78). The difference between summation approach

valuations and the component contribution to the explained variances are as follows: teacher component –3.2%, parent assessed skills via peer comparisons are +6.4%, self-described class and schoolwork competence +3%, parent assessed physical activeness –3.9%, and SDQ behaviors +2.3. Resolving these discrepancies is the reason for taking this factor loading approach to composite construction.

To rectify this we begin by accumulating the total max values (T_c) by component.

$$T_c = \sum_{i=1}^{k_c} t_{ci}$$

(A1.4)

Here k_c is the number of variables for a given component (c). This is where we obtain the 24, 20, 16, 10, and 8 used in the calculations (above). The 78, used as the denominator in the (above) calculations, is from the Figure 18 field TotVals (W), which is a total of all cumulative max (T_c) for the components.

$$W = \sum_{c=1}^{5} T_c \quad \text{or} \quad W = \sum_{n=1}^{20} t_n$$

(A1.5) or (A1.6)

Dividing each component total max values (T_c) by the TotVals (W) total yields the component raw values distribution percentages (D_c = % of TotVals).

$$D_c = \frac{T_c}{W}$$

(A1.7)

Again, the Variable Maximum Values Distribution percentages (30.8% , 25.6%, 20.5%, 12.8%, and 10.3%) for the explanation of Figure 19 (above) are calculated in this manner.

The calculations which follow are towards realigning the component variable values to the component's contribution to the variance explained. First, a recoding multiplier (M_c) is computed by dividing the % of variance (V_c) explained by the component raw values percentage (D_c) of the sum of all variable maximums (W).

$$M_c = \frac{V_c}{D_c} \tag{A1.8}$$

The next step is to calculate a new rescaled variable maximum (S_c) value – the intent was to not only shift the sum of component variable maximums to match the relative percentages of the explained variances, but also to redistribute the variables within the components in alignment with their % contribution as determined by the factor loadings. This is accomplished by multiplying the variable percentage of the component factor loadings (F_{ci}) by the total of the component's maximum raw values (T_c) and also by the recoding multiplier (M_c) as depicted in the following formula:

$$S_{ci} = F_{ci} * T_c * M_c \tag{A1.9}$$

This produces a recoded variable maximum that achieves both of these ends. The pie chart of the component's contribution to explained variance (on the left) of Figure 20 is now equivalent to the Social Competence Variables Recoded Values Distribution chart (on the right).

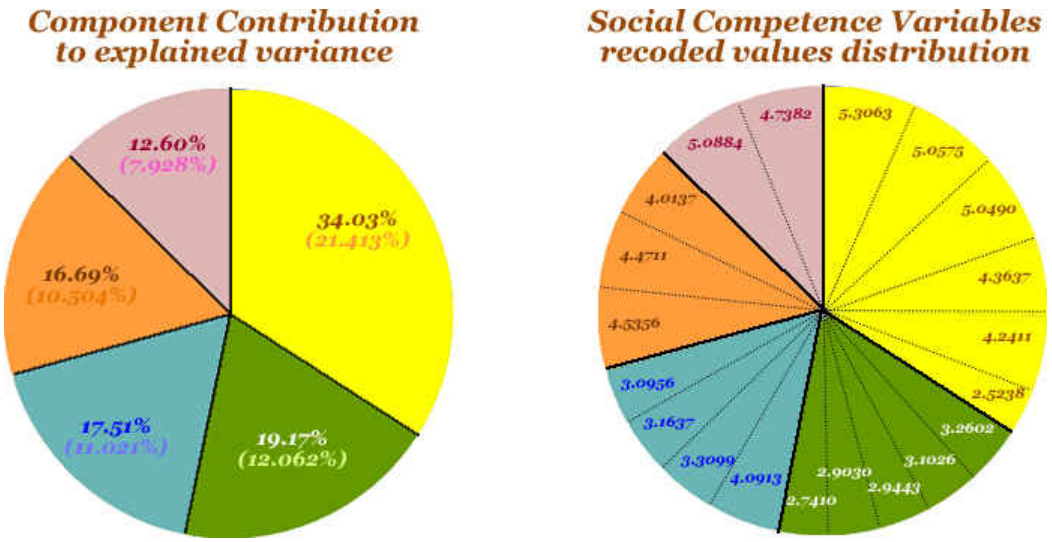


Figure 20: Social Competence Component Explained Variance Contribution vs. Distribution of Recoded Variable Maximum

Now, the recoding multipliers are calculated by dividing the Recoded max value by the original max value. It is worth reiterating here, that this process is effective on variables of differing scales. The original social competence variables are multiplied by the recoding multiplier to create composite component variables. Finally the social competence composite is the sum of the composite component variables.

Alternatively, a composite floor can be calculated to account for the unexplained variance. The composite floor is considered to be in the same relationship to the total of the maximum value of the variables (*W*), as the % of unexplained variance is to the cumulative percentage of variance explained. The composite floor, when added to the sum of the composite component variables should not change the standard deviation of the social competence composite but will shift the median.

Finally, correlations are presented for the weighted composite components, to demonstrate that reliability and sphericity has been maintained in the composite.

As an alternative to Constructing Social Competence Composite via Factor Loading the redistribution could be based upon the totals of the initial eigenvalues for each component. By using these values instead of the component sum of the factor loadings (@ Equation A1.2), the factor loading percentage (Fci) calculated @ Equation A1.3 will actually be the values from the Component Score Coefficient Matrix. In future research the use of these coefficients may be preferred over the factor loading percentage.

APPENDIX B
SOCIAL COMPETENCE RECODING CORRELATIONS

SOCIAL COMPETENCY	ECLS-K Variable Name	Bivariate Correlation with Reading IRT Scale Score (C5R3RSCL) Pearson Correlation	Sig. (2-tailed)	14155 N	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
Parent Responses								
Peer Comparisons					REVERSE CODED			
Child as Good as Same-Age Children	P5SAMEAG	-0.106**	0	12249	0.106**	0		
Child as Attentive as Same-Age Children	P5ATTENI	-0.216**	0	12248	0.216**	0		
Child as Clever as Same-Age Children	P5SOLVE	-0.390**	0	12240	0.390**	0		
Child as Articulate as Same-Age Children	P5PRONOU	-0.324**	0	12246	0.324**	0		
Child Behaves as Well as Same-Age Child	P5BEHAVE	-0.153**	0	12237	0.153**	0		
Child as Active as Same-Age Children	P5ACTIVE	-0.057**	0	12253	0.057**	0		
Structured/Unstructured Play Comparisons					132 DESCENDING		231 ASCENDING	
During Structured Activities	P5STRUCT	-0.006++	0.5	12227	0.010++	0.246	0.018*	0.049
Physically Active Free-Time	P5PHYACT	0.024**	0.009	12237	0.061**	0	0.021*	0.019
Teacher Responses								
Social Rating Scale (SRS)								
Approaches to Learning	T5LEARN	0.435**	0	11495				
Self-Control	T5CONTRO	0.242**	0	11389				
Interpersonal	T5INTERP	0.267**	0	11357	REVERSE CODED			
Externalizing Problem Behaviors	T5EXTERN	-0.222**	0	11471	0.222**	0		
Internalizing Problem Behaviors	T5INTERN	-0.229**	0	11378	0.229**	0		
Combo of Self-Control & Interpersonal	T5SCINT	0.268**	0	11456				
Student Responses								
Self-Description Questionnaire (SDQ)								
SDQ Reading scale	C5SDQRDC	0.193**	0	14142				
SDQ Mathematics scale	C5SDQMTC	-0.076**	0	14142				
SDQ School scale	C5SDQSBC	0.014++	0.106	14142				
SDQ Peer scale	C5SDQPRC	-0.035**	0	14141	REVERSE CODED			
SDQ Anger/Distractibility scale	C5SDQEXT	-0.302**	0	14142	0.302**	0		
SDQ Sad/Lonely/Anxious scale	C5SDQINT	-0.417**	0	14142	0.417**	0		

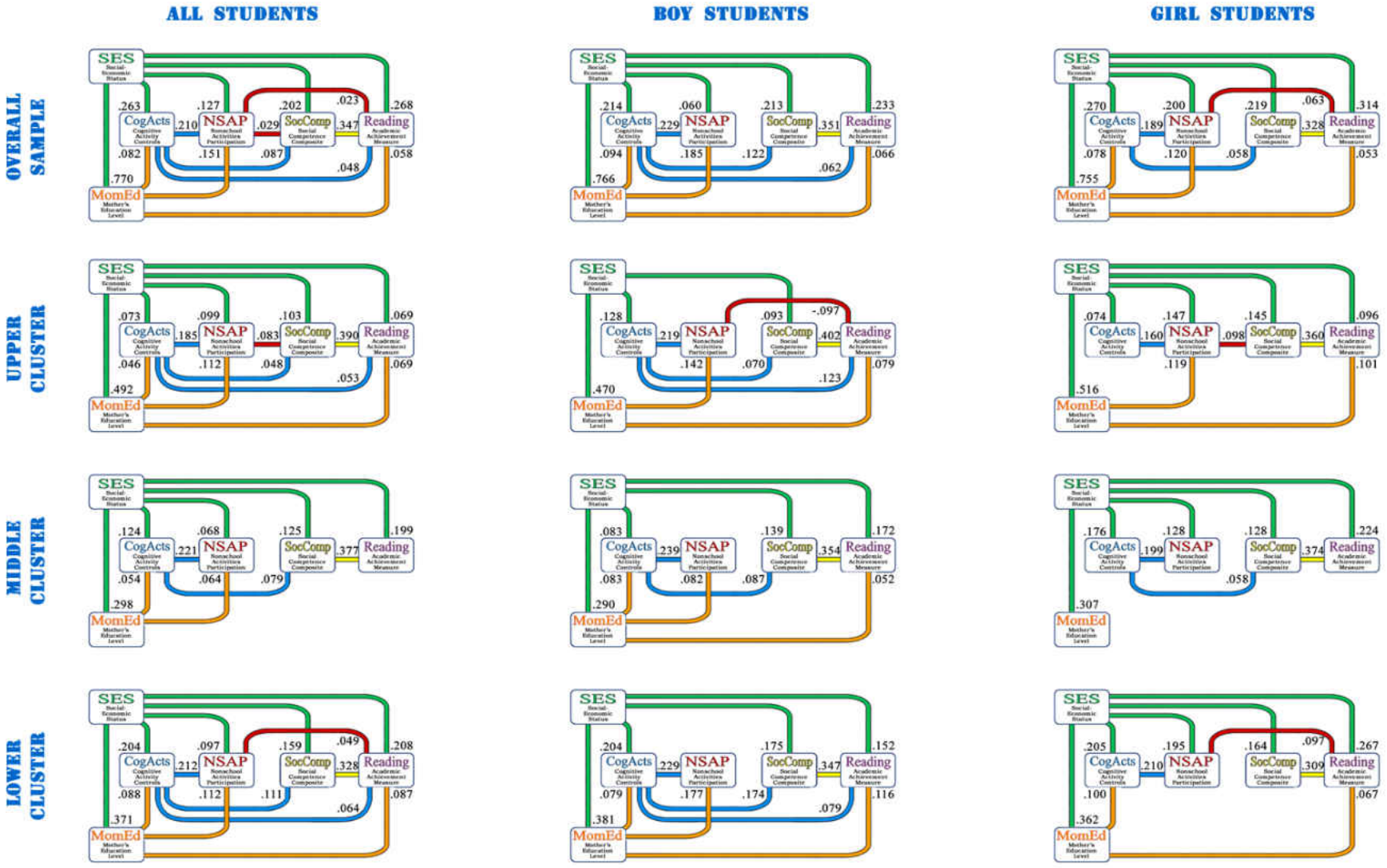
** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

++ Correlation is NOT significant (> 0.05 level; 2-tailed).

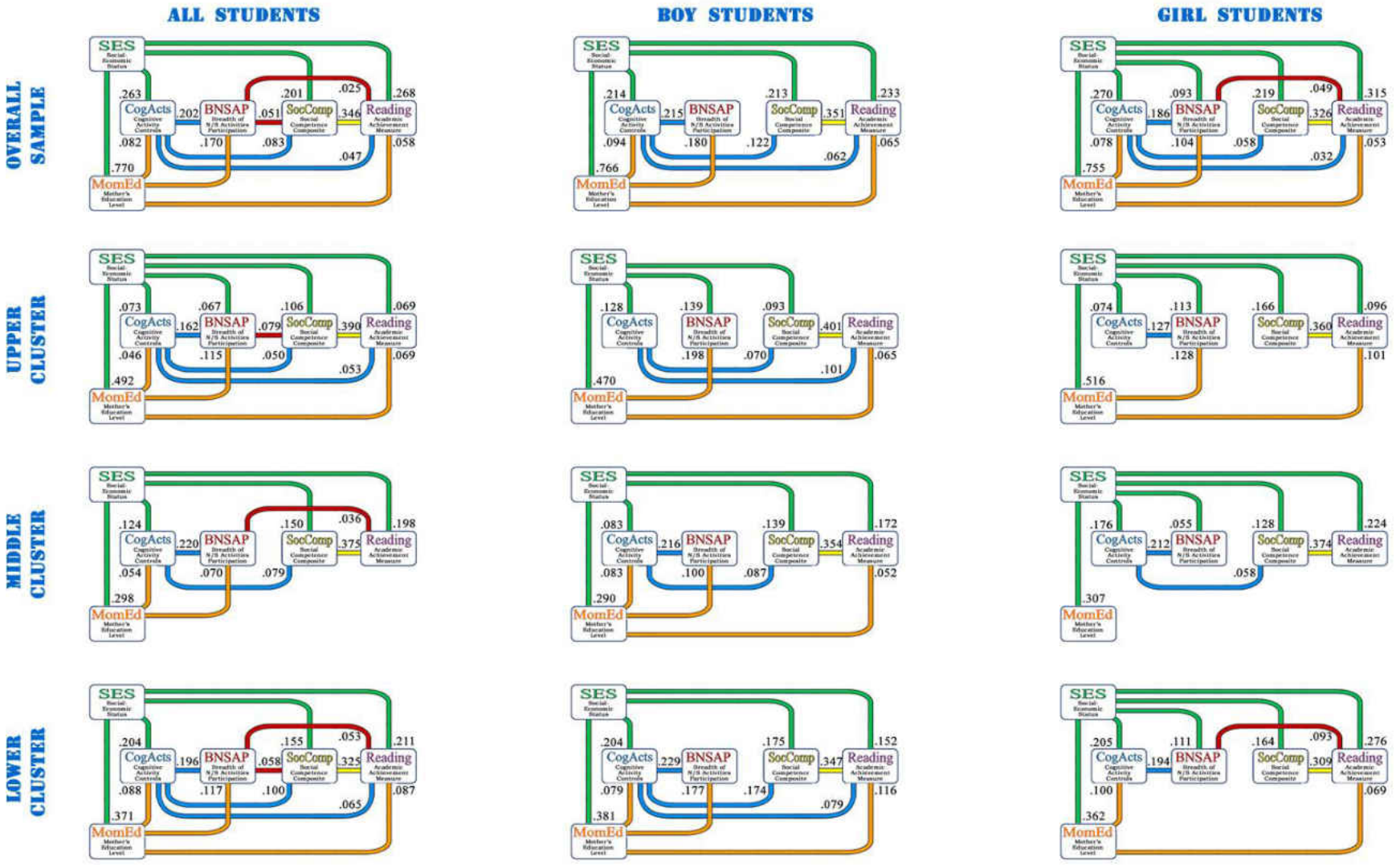
APPENDIX C
ANNOTATED REVISED THEORETICAL MODELS

Total NSAP Model Iterations
(by Cluster / Gender)



Total BNSAP Model Iterations

(by Cluster / Gender)



APPENDIX D
READING VS. SOCIAL COMPETENCE - STANDARDIZED BETA COEFFICIENTS

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
1ST Grade Reading	TOTAL	.612	.611	.631	.631	.585	.586	.657	.656	.658	.659	.658	.658	.647	.648	.676	.678	.608	.611	.615	.615	.622	.622	.607	.607
Regressed Prior		.165	.162	.157	.157	.165	.164	.147	.146	.165	.163	.133	.133	.162	.161	.139	.140	.182	.183	.184	.184	.176	.176	.187	.187
Reading Change		.108	.106	.106	.106	.109	.109	.160	.158	.191	.188	.139	.139	.114	.113	.114	.116	.108	.110	.047	.047			.087	.087
Reading 3rd Gr.		.349	.348	.354	.354	.329	.327	.329	.329	.354	.354	.291	.291	.369	.368	.340	.340	.376	.379	.378	.378	.402	.400	.321	.321
Reading Pct Chg		-.076	-.076	-.076	-.076	-.066	-.066							-.072	-.072			-.079	-.079	-.144	-.144	-.187	-.188		
Reading Pct Cut		-.087	-.087	-.098	-.098	-.056	-.056							-.098	-.098	-.093	-.091	-.086	-.086	-.129	-.129	-.172	-.172		
1ST Grade Reading	VENUE	.608	.608	.631	.630	.580	.582	.653	.654	.654	.653	.658	.658	.644	.643	.676	.676	.601	.603	.615	.615	.622	.623	.607	.612
Regressed Prior		.162	.162	.157	.157	.165	.164	.149	.149	.166	.167	.133	.133	.160	.160	.139	.139	.181	.182	.180	.180	.176	.175	.187	.181
Reading Change		.106	.106	.106	.105	.108	.107	.161	.161	.190	.188	.139	.139	.111	.111	.114	.116	.105	.106					.087	.084
Reading 3rd Gr.		.347	.346	.354	.353	.320	.326	.334	.329	.354	.356	.289	.284	.362	.363	.340	.339	.370	.372	.381	.380	.399	.401	.321	.321
Reading Pct Chg		-.076	-.076	-.076	-.076	-.066	-.066							-.072	-.072			-.079	-.079	-.147	-.148	-.184	-.186		
Reading Pct Cut		-.087	-.087	-.098	-.098	-.056	-.056							-.099	-.097	-.093	-.092	-.086	-.086	-.129	-.129	-.172	-.172		
1ST Grade Reading	IMPETUS	.610	.611	.631	.631	.584	.586	.655	.655	.659	.658	.658	.658	.646	.647	.676	.676	.605	.608	.614	.616	.618	.622	.607	.612
Regressed Prior		.163	.162	.157	.157	.164	.164	.147	.147	.163	.164	.133	.133	.161	.161	.139	.139	.181	.182	.181	.183	.176	.176	.187	.187
Reading Change		.106	.106	.106	.106	.108	.108	.158	.158	.188	.188	.139	.139	.113	.113	.115	.114	.106	.108					.083	.082
Reading 3rd Gr.		.348	.348	.355	.355	.326	.326	.329	.329	.358	.357	.291	.291	.367	.368	.340	.340	.371	.375	.378	.383	.397	.400	.321	.326
Reading Pct Chg		-.076	-.076	-.078	-.076	-.066	-.066							-.074	-.072			-.079	-.079	-.148	-.150	-.188	-.189		
Reading Pct Cut		-.087	-.087	-.098	-.098	-.056	-.056							-.098	-.098	-.093	-.093	-.086	-.086	-.129	-.134	-.172	-.172		
1ST Grade Reading	INVOLVEMENT	.610	.611	.631	.631	.584	.586	.655	.656	.656	.659	.658	.658	.645	.648	.677	.678	.604	.611	.615	.615	.622	.622	.607	.607
Regressed Prior		.164	.162	.157	.157	.165	.165	.148	.148	.167	.163	.133	.133	.161	.160	.140	.140	.181	.184	.184	.184	.176	.176	.187	.187
Reading Change		.107	.106	.106	.106	.109	.109	.162	.161	.192	.188	.139	.139	.113	.112	.116	.117	.105	.110	.047	.047			.087	.087
Reading 3rd Gr.		.349	.348	.355	.354	.327	.328	.329	.329	.358	.354	.291	.291	.365	.368	.340	.340	.370	.379	.378	.378	.400	.400	.321	.321
Reading Pct Chg		-.076	-.075	-.076	-.076	-.066	-.066							-.072	-.074			-.079	-.079	-.148	-.144	-.185	-.185		
Reading Pct Cut		-.087	-.087	-.098	-.098	-.056	-.056							-.099	-.099	-.093	-.091	-.086	-.086	-.129	-.129	-.172	-.172		
1ST Grade Reading	DENDROGRAM	.611	.611	.631	.631	.586	.585	.656	.656	.659	.658	.658	.658	.647	.648	.676	.676	.607	.612	.615	.615	.622	.622	.607	.607
Regressed Prior		.162	.163	.157	.157	.164	.165	.145	.146	.163	.165	.133	.133	.162	.161	.139	.139	.183	.183	.184	.184	.176	.176	.187	.187
Reading Change		.108	.107	.106	.106	.109	.109	.158	.158	.188	.188	.139	.139	.114	.113	.115	.118	.108	.109	.047	.047			.089	.082
Reading 3rd Gr.		.348	.348	.354	.354	.329	.328	.329	.329	.354	.354	.291	.291	.369	.368	.340	.340	.378	.379	.376	.377	.399	.400	.321	.318
Reading Pct Chg		-.076	-.076	-.076	-.076	-.066	-.066							-.072	-.072			-.079	-.079	-.142	-.146	-.185	-.185		
Reading Pct Cut		-.087	-.087	-.098	-.097	-.056	-.056							-.099	-.099	-.092	-.089	-.086	-.086	-.129	-.131	-.172	-.172		

Read3rd regressed on Read1st, SocComp, Activity, CogActs, MOMED, SESQ

ReadChg regressed on SocComp, Activity, CogActs, MOMED, SESQ

Read3rd regressed on SocComp, Activity, CogActs, MOMED, SESQ

ReadPct regressed on SocComp, Activity, CogActs, MOMED, SESQ

ReadPcl regressed on SocComp, Activity, CogActs, MOMED, SESQ

APPENDIX E
READING VS. ACTIVITY PARTICIPATION - STANDARDIZED BETA COEFFICIENTS

	Dependent Variable	Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
TOTAL	TotalAP		0.025			0.031	0.032	-0.037		-0.054				0.049	0.046	0.038	0.075	0.053							
			0.031		0.035			-0.060		-0.080				0.063	0.063	0.067	0.081	0.062							
		0.023	0.029			0.063	0.049							0.058	0.045		0.100	0.063			-0.065				
	Cognitive Activities	0.038	0.038	0.053	0.053					0.079										0.075	0.075	0.069	0.070		
		0.048	0.048	0.068	0.068					0.082	0.082									0.074	0.074	0.076	0.076		
		0.052	0.049	0.070	0.070	0.030	0.030	0.081	0.073	0.101	0.088									0.066	0.066	0.099	0.099		
		0.077	0.070	0.105	0.096	0.044	0.044	0.107	0.094	0.144	0.126									0.101	0.101	0.130	0.130		
		0.048	0.047	0.062	0.062		0.032	0.113	0.113	0.101	0.101	0.119	0.119							0.048	0.048	0.101	0.087		
VENUE	LessonsAP							-0.063	-0.057											0.047	0.055	0.099	0.067		0.074
								-0.058																	0.071
		0.045	0.045	0.030	0.034	0.063	0.059							0.068	0.062		0.108	0.090		0.060	0.052	0.066	0.053		0.066
		0.039	0.043	0.037	0.041	0.043	0.048							0.074	0.061		0.104	0.081		0.063	0.073	0.085	0.076		0.084
		0.061	0.080		0.052	0.114	0.101		0.072			0.076	0.108	0.115	0.107	0.059	0.171	0.142			0.075		0.064		
	CommunityAP										-0.090														
									-0.060	-0.086	-0.110									-0.040		-0.055			
		0.025						0.062		0.084	0.068										-0.049	-0.077	-0.092		
	FamilyAP															0.054									
		-0.027		-0.024		-0.029		-0.052	-0.042	-0.064	-0.058				0.041	0.059									
								-0.067	-0.053	-0.081						0.056									
		-0.053	-0.037	-0.046	-0.051	-0.052		-0.093	-0.088	-0.130	-0.123			-0.041			-0.056			-0.053					
	Cognitive Activities	0.038	0.038	0.053	0.053					0.073	0.073									0.070	0.067	0.069	0.073		
		0.048	0.048	0.068	0.068									0.039						0.074	0.074	0.076	0.076		
		0.055	0.048	0.072	0.064	0.035	0.028	0.085	0.083	0.106	0.103									0.063	0.059	0.094	0.090		
		0.072	0.070	0.099	0.098	0.040	0.038	0.110	0.106	0.148	0.126									0.094	0.090	0.117	0.117		
		0.056	0.050	0.073	0.065	0.046		0.130	0.124	0.137	0.134	0.114	0.107							0.059		0.094	0.086		
IMPETUS	ExperienceAP												-0.086												
															0.040										
		-0.021	-0.020					-0.037	-0.036																
								-0.051																	
		-0.030	-0.030	-0.037	-0.036				-0.048	-0.076	-0.083			-0.055	-0.045		-0.065								
	TrainingAP								-0.057		-0.094			0.039		0.052				0.060	0.091	0.089	0.069		0.135
														0.040							0.074				0.136
		0.038	0.034			0.045	0.038				-0.050			0.060	0.045		0.092	0.064		0.046	0.062				0.083
		0.038	0.035			0.042	0.041							0.072	0.053	0.053	0.092	0.061		0.065	0.097		0.068	0.077	0.136
		0.045	0.039			0.067	0.049							0.085	0.076		0.137	0.098							
	RecreationAP							-0.062		-0.094															
										-0.088															
																				-0.042	-0.039	-0.057			-0.059
														0.045			0.052			-0.056	-0.050	-0.096			-0.074
	Cognitive Activities	0.038	0.038	0.053	0.053						0.086									0.065	0.058	0.067	0.071		
		0.048	0.048	0.068	0.068					0.073	0.082									0.074	0.059	0.076	0.076		
		0.051	0.051	0.070	0.070	0.030	0.030	0.079	0.080	0.088	0.102									0.064	0.058	0.107	0.099		
		0.070	0.070	0.105	0.105	0.038	0.037	0.103	0.094	0.126	0.126									0.090	0.082	0.130	0.116		
		0.051	0.051	0.069	0.068	0.032	0.034	0.113	0.123	0.119	0.121	0.119	0.119							0.054	0.053	0.099	0.087		

ReadPct regressed on SocComp, Activity, CogActs, MOMED, SESQ
ReadPcl regressed on SocComp, Activity, CogActs, MOMED, SESQ

Read3rd regressed on Read1st, SocComp, Activity, CogActs, MOMED, SESQ
ReadChg regressed on SocComp, Activity, CogActs, MOMED, SESQ
Read3rd regressed on SocComp, Activity, CogActs, MOMED, SESQ

	Dependent Variable	Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
INVOLVE	ParticipateAP														0.048	0.053	0.072								
															0.044		0.068								
		0.036	0.029		0.024	0.045	0.031							0.066	0.057	0.036	0.045	0.098	0.069						
		0.031	0.033		0.041	0.037	0.037							0.077	0.077	0.058	0.076	0.099	0.084						
		0.056	0.030			0.087	0.044							0.105	0.058			0.159	0.078			-0.063			
	ObserveAP		-0.027					-0.059	-0.071			-0.072	-0.099							0.050					
									-0.056																
		-0.024	-0.017					-0.043	-0.039	-0.063															
							-0.036	-0.061	-0.058	-0.084															
		-0.042		-0.043		-0.034		-0.049		-0.095				-0.057				-0.070							
	Cognitive Activities	0.038	0.043	0.053	0.053															0.068	0.075	0.085	0.085		
		0.048	0.048	0.068	0.068					0.082	0.082			0.039						0.074	0.074	0.076	0.076		
		0.053	0.053	0.070	0.066	0.029	0.031	0.081	0.080	0.103	0.088									0.066	0.066	0.099	0.099		
		0.071	0.071	0.105	0.097	0.038	0.044	0.105	0.104	0.146	0.126									0.101	0.101	0.130	0.130		
		0.052	0.049	0.071	0.062	0.033	0.034	0.122	0.113	0.124	0.101	0.119	0.119							0.048	0.048	0.099	0.087		
DENDROGRAM	LearningAP									-0.078															
		0.019	0.020			0.027	0.029				-0.049			0.032	0.039			0.047	0.052						
														0.040	0.050			0.071	0.066						
		0.026	0.030			0.039	0.052							0.039	0.045				0.053		0.059				0.071
	PlayAP							-0.057				-0.076					0.059			0.050	0.049				
					0.039											0.054	0.059				0.049			0.069	0.080
								-0.036						0.034				0.053							
			0.028					-0.056						0.044		0.053	0.058							0.078	0.089
						0.042								0.037				0.100		-0.054		-0.092			
	Cognitive Activities	0.038	0.038	0.053	0.053															0.067	0.066	0.085	0.085		
		0.048	0.048	0.068	0.060					0.085	0.082			0.039	0.039					0.074	0.064	0.076	0.076		
		0.052	0.051	0.070	0.070	0.032	0.031	0.081	0.073	0.088	0.097									0.066	0.066	0.099	0.099		
		0.077	0.071	0.105	0.105	0.044	0.044	0.106	0.094	0.126	0.126									0.101	0.101	0.130	0.130		
		0.050	0.049	0.062	0.062		0.034	0.113	0.113	0.101	0.101	0.119	0.119							0.057		0.104	0.087		

ReadPct regressed on SocComp, Activity, CogActs, MOMED, SESQ
ReadPcl regressed on SocComp, Activity, CogActs, MOMED, SESQ

Read3rd regressed on Read1st, SocComp, Activity, CogActs, MOMED, SESQ
ReadChg regressed on SocComp, Activity, CogActs, MOMED, SESQ
Read3rd regressed on SocComp, Activity, CogActs, MOMED, SESQ

APPENDIX F
SOCIAL COMPETENCE ASSOCIATIONS - STANDARDIZED BETA COEFFICIENTS

Dependent Variable -		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
SOCIAL COMPETENCE		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
TotalAP	TOTAL		.051						.097											.079	.105				
Cognitive Activities		.093	.082	.123	.123	.055	.055	.139	.128	.209	.209	.105	.105	.054	.054	.075	.075			.073	.069	.080	.080	.098	.098
Mom Ed Level														-.039	-.039										
SES Quintile		.205	.198	.211	.211	.212	.212	.059		.083	.083			.064	.064			.080	.080	ALL 5TH QUINTILE					
LessonsAP	VENUE	.046	.055						.080			.078	.121	.068	.064					.075	.071				
CommunityAP												-.099	-.128												
FamilyAP														-.042											
Cognitive Activities		.087	.085	.123	.123	.055	.055	.139	.135	.209	.209	.114	.108	.054	.046	.075	.075			.080	.079	.080	.080	.098	.098
Mom Ed Level														-.046	-.046										
SES Quintile		.191	.191	.211	.211	.212	.212	.059		.083	.083			.061	.061			.080	.080	ALL 5TH QUINTILE					
ExperienceAP	IMPETUS																			.055					
TrainingAP		.047	.042		.038			.059	.083				.087							.059					
RecreationAP		-.028		-.046	-.085						-.082				.039	-.055	-.094				.095				
Cognitive Activities		.088	.085	.127	.117	.055	.055	.128	.129	.209	.204	.105	.089	.054	.053	.080	.079			.071	.080	.080	.080	.098	.098
Mom Ed Level														-.039	-.042										
SES Quintile		.196	.197	.214	.203	.212	.212	.052		.083	.082			.064	.063			.080	.080	ALL 5TH QUINTILE					
ParticipateAP	INVOLVE		.046						.073												.087				
ObserveAP								.067					.080							.078				.090	
Cognitive Activities		.093	.085	.123	.123	.055	.055	.126	.127	.209	.209	.105	.093	.054	.054	.075	.075			.077	.074	.080	.080	.085	.098
Mom Ed Level														-.039	-.039										
SES Quintile		.205	.199	.211	.211	.212	.212	.054	.054	.083	.083			.064	.064			.080	.080	ALL 5TH QUINTILE					
LearningAP	DENDRO	.069	.045					.064						.064	.049					.134	.091			.083	
PlayAP		-.040							.074				.083	-.045			-.083			-.048					
Cognitive Activities		.091	.086	.123	.123	.055	.055	.132	.124	.209	.209	.105	.086	.052	.047	.075	.089			.078	.076	.080	.080	.087	.098
Mom Ed Level														-.044	-.044										
SES Quintile		.195	.196	.211	.211	.212	.212	.054	.055	.083	.083			.061	.062			.080	.080	ALL 5TH QUINTILE					

APPENDIX G
INDEPENDENT VARIABLES - STANDARDIZED BETA COEFFICIENTS

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
Dependent Variable -		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
TotalAP	TOTAL																								
Cognitive Activities		.210	.202	.229	.215	.189	.186	.211	.198	.233	.232	.202	.205	.201	.181	.214	.188	.179	.152	.204	.188	.222	.212	.190	.166
Mom Ed Level		.151	.170	.185	.180	.120	.104	.151	.180	.216	.215	.095	.114	.094	.081	.094	.083	.103	.080	.100	.112	.119	.140	.078	.075
SES Quintile		.127		.060		.200	.093	.075				.119		.047		.068				ALL 5TH QUINTILE					
Cognitive Activities																									
Mom Ed Level		0.086		0.094		0.078		0.097		0.089		0.116		0.045						0.052		0.084			
SES Quintile		0.242		0.214		0.270		0.127		0.162		0.083		0.057		0.067		0.073		ALL 5TH QUINTILE					
Mom Ed Level																									
SES Quintile		0.761		0.766		0.755		0.413		0.448		0.384		0.338		0.333		0.342		ALL 5TH QUINTILE					

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
Dependent Variable -		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
LessonsAP	VENUE																								
CommunityAP		.365	.374	.323	.326	.372	.371	.326	.319	.312	.288	.346	.345	.392	.401	.353	.371	.404	.386	.427	.435	.334	.343	.443	.436
FamilyAP		.149	.148	.186	.174	.125	.107	.215	.189	.288	.226	.145	.148	.141	.135	.198	.177	.115	.084	.125	.136	.121	.133	.159	.115
Cognitive Activities		.055	.080	.074	.100	.036	.067		.077	.076	.142			.073	.083		.061	.084	.100	.057	.079	.093	.103		.072
Mom Ed Level		.109	.107	.147	.150	.084	.079	.053	.061		.086			.070	.063	.090	.063	.080	.066	.084	.087	.115	.107	.066	.080
SES Quintile		.133	.105	.070	.055	.200	.161	.078	.064			.131	.135	.036						ALL 5TH QUINTILE					
CommunityAP																									
LessonsAP		.408	.416	.366	.367	.417	.406	.347	.341	.371	.316	.348	.345	.410	.424	.378	.390	.416	.403	.453	.467	.370	.365	.464	.460
FamilyAP		.053	.039	.057		.057	.057	.079	.063			.088	.102	.055		.052		.064							
Cognitive Activities		.024				.052	.046					.107	.071												
Mom Ed Level		.066	.072	.052	.063	.082	.090	.075	.081		.074	.082	.081	.058	.064		.062	.072	.072				.072		
SES Quintile																				ALL 5TH QUINTILE					
FamilyAP																									
LessonsAP		.220	.217	.233	.233	.217	.205	.227	.207	.308	.248	.167	.163	.166	.176	.230	.204	.136	.116	.163	.178	.156	.146	.185	.157
CommunityAP		.054	.034	.076		.036		.073	.064			.099	.115	.059				.070							
Cognitive Activities		.209	.179	.217	.187	.198	.178	.211	.199	.229	.214	.176	.188	.168	.154	.208	.182	.125	.116	.193	.161	.176	.155	.209	.176
Mom Ed Level								.076	.087	.140	.118														
SES Quintile																				ALL 5TH QUINTILE					
Cognitive Activities																									
Mom Ed Level		.086		.094		.078		.097		.089		.116		.045						.052		.084			
SES Quintile		.242		.214		.270		.127		.162		.083		.057		.067		.073		ALL 5TH QUINTILE					
Mom Ed Level																									
SES Quintile		.761		.766		.755		.413		.448		.384								ALL 5TH QUINTILE					

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
Dependent Variable -		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
ExperienceAP																									
TrainingAP		.303	.304	.307	.300	.287	.296	.323	.313	.352	.316	.298	.274	.286	.301	.302	.313	.264	.281	.302	.276	.283	.274	.284	.284
RecreationAP		.077		.061		.093		.081	.050			.166	.174	.108		.087		.127				.069			-.083
Cognitive Activities		.115	.119	.131	.122	.102	.115	.111	.124	.150	.149		.079	.112	.114	.110	.103	.111	.122	.102	.090	.086	.077	.118	.118
Mom Ed Level		.056	.067	.091	.062		.071	.091	.113	.141	.150									.061	.065			.067	.069
SES Quintile		.052	.059		.052	.109	.073						.090	.041	.052	.065	.082			ALL 5TH QUINTILE					
TrainingAP																									
ExperienceAP		.272	.275	.275	.277	.257	.273	.298	.292	.314	.305	.270	.264	.271	.283	.291	.296	.248	.273	.273	.259	.261	.249	.272	.269
RecreationAP		.243	.218	.228	.197	.248	.213	.280	.239	.315	.252	.274	.217	.230	.204	.201	.178	.246	.199	.249	.216	.157	.138	.293	.239
Cognitive Activities	IMPETUS	.098	.136	.138	.173	.062	.099	.096	.163	.176	.234		.103	.102	.121	.114	.147	.085	.096	.099	.135	.132	.151	.078	.121
Mom Ed Level		.089	.073	.117	.105	.067					.086			.061		.051		.073		.072	.064	.106	.100		
SES Quintile		.102	.083	.059	.055	.150	.141	.068	.088			.104	.114							ALL 5TH QUINTILE					
RecreationAP																									
ExperienceAP		.087		.100		.097		.090	.059			.145	.184	.115		.096		.133				.073			-.079
TrainingAP		.319	.272	.296	.239	.289	.270	.320	.280	.400	.297	.273	.237	.257	.234	.229	.207	.269	.216	.283	.238	.172	.159	.319	.274
Cognitive Activities		.039			-.039	.087			-.060	-.078	-.164	.167								.058	.056	.080	.080		
Mom Ed Level					.064	.036		.076	.063			.082		.044	.048	.072	.082								
SES Quintile			-.031		-.109				-.079											ALL 5TH QUINTILE					
Cognitive Activities																									
Mom Ed Level		.086		.094		.078		.097		.089		.116		.045						.052		.084			
SES Quintile		.242		.214		.270		.127		.162		.083		.057		.067		.073		ALL 5TH QUINTILE					
Mom Ed Level																									
SES Quintile		.761		.766		.755		.413		.448		.384		.338		.333		.342		ALL 5TH QUINTILE					

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
Dependent Variable -		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
ParticipateAP	INVOLVEMENT																								
ObserveAP		.256	.183	.267	.202	.242	.164	.309	.222	.354	.241	.281	.220	.250	.157	.269	.215	.238	.114	.235	.185	.219	.178	.236	.173
Cognitive Activities		.118	.122	.122	.116	.116	.138	.114	.116	.086	.111	.150	.168	.104	.098	.104	.091	.095	.072	.137	.145	.157	.153	.125	.148
Mom Ed Level		.141	.135	.197	.133	.128	.153	.105	.131	.100	.105	.104	.122	.105	.091	.110	.077	.127	.108	.083	.084	.105	.102		
SES Quintile		.111				.175		.069				.131		.040						ALL 5TH QUINTILE					
ObserveAP																									
ParticipateAP		.275	.182	.276	.199	.267	.164	.315	.220	.337	.225	.297	.232	.252	.157	.270	.214	.237	.113	.242	.192	.229	.181	.236	.175
Cognitive Activities		.145	.157	.168	.173	.121	.140	.133	.151	.183	.180	.071	.104	.149	.163	.165	.166	.132	.161	.113	.108	.117	.110	.110	.102
Mom Ed Level			.044	.060	.108			.067	.117	.144	.205												.063		
SES Quintile		.046	.070			.043	.103													ALL 5TH QUINTILE					
Cognitive Activities																									
Mom Ed Level		.086		.094		.078	.078	.097		.089		.116		.045						.052		.084			
SES Quintile		.242		.214		.270	.270	.127		.162		.083		.057		.067		.073		ALL 5TH QUINTILE					
Mom Ed Level																									
SES Quintile		.761		.766		.755	.755	.413		.448		.384		.338		.333		.342		ALL 5TH QUINTILE					

		Overall Sample						Lower Cluster						Middle Cluster						Upper Cluster					
		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls		All Students		All Boys		All Girls	
Dependent Variable -		NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP	NSAP	BNSAP
LearningAP	DENDROGRAM																								
PlayAP		.111	.119	.176	.121	.132	.075	.182	.153	.211	.136	.229	.138	.097	.123	.160	.133	.132	.069	.054	.082	.157	.111		
Cognitive Activities		.112	.127	.125	.145	.090	.121	.064	.104	.132	.163		.093	.129	.139	.105	.118	.116	.147	.131	.125	.132	.142	.132	.124
Mom Ed Level		.160	.162	.195	.194	.149	.168	.127	.110	.103	.134	.115		.096	.089	.080	.059	.123	.123	.122	.139	.129	.114	.118	.165
SES Quintile		.084	.077			.152	.122				-.090		.125	.047	.043	.063	.072			ALL 5TH QUINTILE					
PlayAP																									
LearningAP		.113	.128	.179	.136	.139	.082	.174	.150	.209	.129	.209	.132	.103	.122	.161	.135	.135	.071	.055	.080	.161	.115		
Cognitive Activities		.176	.169	.178	.163	.167	.170	.198	.186	.146	.184	.226	.215	.146	.115	.173	.149	.120	.073	.158	.181	.160	.174	.148	.192
Mom Ed Level		.043		.106			-.069	.070	.091	.122	.146					.051			-.080						
SES Quintile		.090	-.028			.117		.095		.097		.089								ALL 5TH QUINTILE					
Cognitive Activities																									
Mom Ed Level		.086		.094		.078		.097		.089		.116		.045						.052		.084			
SES Quintile		.242		.214		.270		.127		.162		.083		.057		.067		.073		ALL 5TH QUINTILE					
Mom Ed Level																									
SES Quintile		.761		.766		.755		.413		.448		.384		.338		.333		.342		ALL 5TH QUINTILE					

APPENDIX H
REASSIGNMENT OF AGGREGATE SCORING VARIABLES

The Beneficial Use of Model Manipulation

As for differential associations for different varieties of activities (Eccles, 2005), the shifting of variables about in the current study is accomplished by two methods. Alternative aggregations give different results for slightly distinguished profiles of student participation. Demonstrated below is the effect of moving an activity indicator (Nature student) from one category (FamilyAP) to another (LessonsAP) and from changing a diversity code (attending a sporting event from outings to sports).

One major benefit of this multi-view approach is support for the notion that a variable's existence doesn't justify its place in a scoring model (*see* Lomax, 2001). The ineptness of some model categories argues for their non-representativeness. In the results presented, the FamilyAP category never shows a positive association with either outcome variable. However, from it is evident that there are positive associations had nature taught in the home not been removed from the FamilyAP category. This supports the argument that an activity may correctly be included in more than one model category and provide the researcher valuable information on each aggregation. The mutually exclusive approach followed in the current study should not be strictly adhered to in future research.

Model Category and Diversity Code Revisions

From the descriptive statistics of Table 13, it may be observed that maximum statistics for NSAP/BNSAP LessonsAP and for the BNSAP ExperienceAP and ObserveAP variables exceed the ranges established by Figure 9 (in Scoring NSAP and BNSAP section of Chapter 3).

The differences result from changes to the aggregate models that have been retained in the results presented in Chapter 4. One change was to move the activity indicator variable for nature student from the venue model FamilyAP category to the LessonsAP category. The other was to change the diversity code on the sporting event activity from outings (6) to sports (8). The immediate effect of these changes appears in the scoring variable maximums. Although the FamilyAP NSAP score can no longer be 11, such would not have been detected from Table 13, since it is not necessary for the sample to have a student who had participated in every family activity. This is evidenced by the ParticipateAP NSAP score maximum statistic 18 of a possible 19. Changing a diversity code increases the BNSAP maximum in every category where another variable of the resulting diversity group is not already present.

The screenshot of the final SPSS script execution of the study presented in Figure 21, not only illustrates how the above changes were incorporated, but reveals how the models can be refined to identify the most significantly associating activities or activity groups. Figure 22 shows the revised model categories and diversity code assignments. Table 21 and Table 22 present the before and after results of these particular changes to the aggregation scoring models, which indicate consistently stronger positive and negative associations. This demonstrates how the correlational and inferential results of a study can be affected, and reinforces the idea that the aggregation constituents have consequences for activity research.

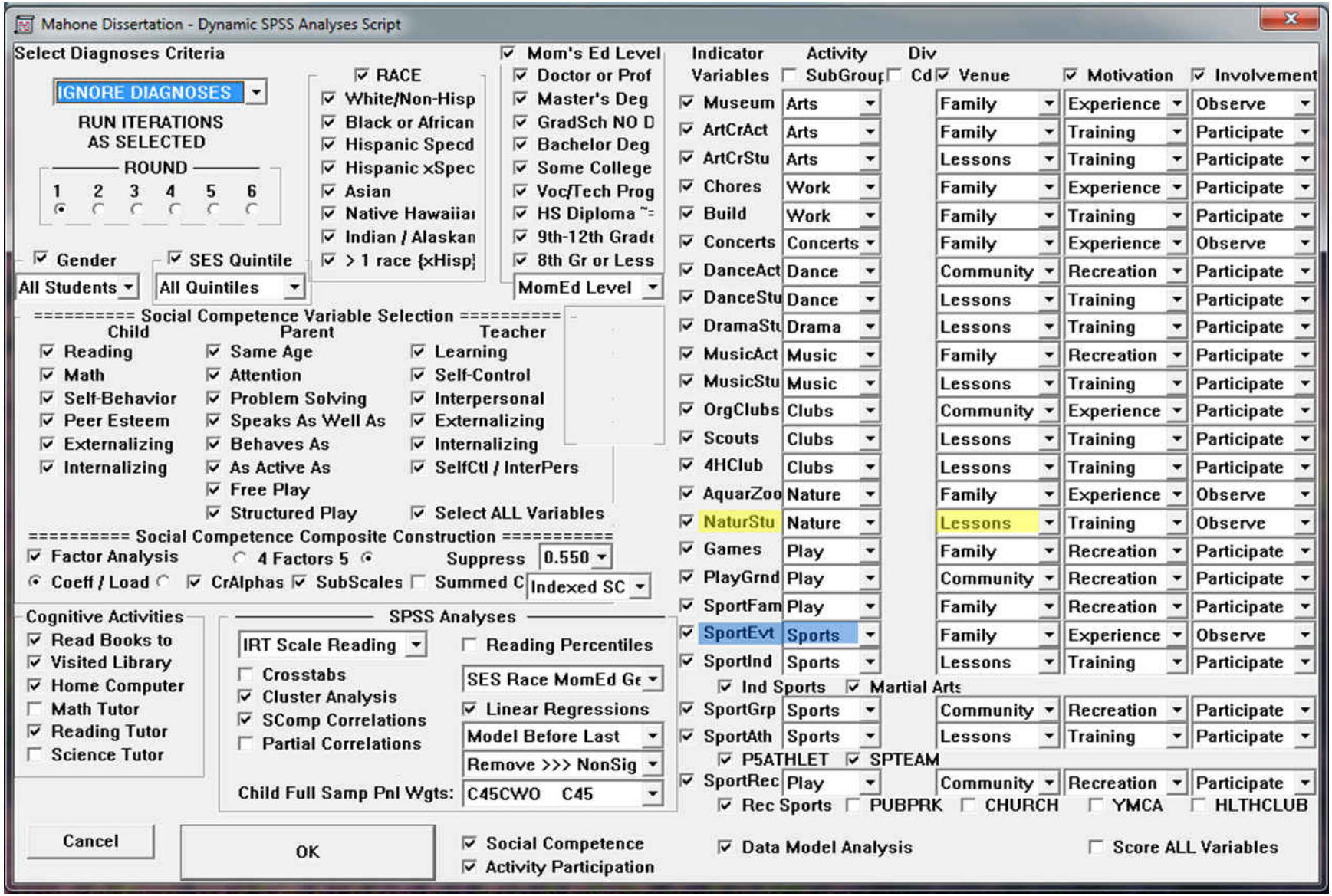


Figure 21: Dialogue from SPSS Analyses Script for Dynamic Model Selection and Analysis

Venue

	Family	DivCd	BoP
1	Arts or Crafts Activities	1	1
2	Family Sing	4	2
3	Visited Zoo or Aquarium	5	3
4	Visited a Museum	6	4
5	Concert, Play, or Show	6	
6	Family Games	7	5
7	Family Sports	8	6
8	Sporting Event	8	
9	Chores	9	7
10	Build Things	9	

	Community		
1	Organized Clubs	2	1
2	Dance Activities	3	2
3	Playground Activities	7	3
4	Recreational Sports	7	
5	Group Sports	8	4

	Lessons		
1	Arts or Crafts Lessons	1	1
2	Scouts/Daisies	2	2
3	4H/Farm Clubs	2	
4	Dance Lessons	3	3
5	Organized Performing Arts	3	
6	Music Lessons	4	4
7	Nature Lessons	5	5
8	Sports Team	8	6
9	Individual Sports	8	

Impetus

	Recreation	DivCd	BoP
1	Dance Activities	3	1
2	Family Sing	4	2
3	Family Games	7	3
4	Playground Activities	7	
5	Recreational Sports	7	
6	Family Sports	8	4
7	Group Sports	8	

	Training		
1	Arts or Crafts Activities	1	1
2	Arts or Crafts Lessons	1	
3	Scouts/Daisies	2	2
4	4H/Farm Clubs	2	
5	Dance Lessons	3	3
6	Organized Performing Arts	3	
7	Music Lessons	4	4
8	Nature Lessons	5	5
9	Sports Team	8	6
10	Individual Sports	8	
11	Build Things	9	7

	Experience		
1	Organized Clubs	2	1
2	Visited Zoo or Aquarium	5	2
3	Visited a Museum	6	3
4	Concert, Play, or Show	6	
5	Sporting Event	8	4
6	Chores	9	5

Involvement

	Observation	DivCd	BoP
1	Visited Zoo or Aquarium	5	1
2	Nature Lessons	5	
3	Visited a Museum	6	2
4	Concert, Play, or Show	6	
5	Sporting Event	8	3

	Participation		
1	Arts or Crafts Activities	1	1
2	Arts or Crafts Lessons	1	
3	Organized Clubs	2	2
4	Scouts/Daisies	2	
5	4H/Farm Clubs	2	
6	Dance Activities	3	3
7	Dance Lessons	3	
8	Organized Performing Arts	3	
9	Family Sing	4	4
10	Music Lessons	4	
11	Family Games	7	5
12	Playground Activities	7	
13	Recreational Sports	7	
14	Family Sports	8	6
15	Sports Team	8	
16	Group Sports	8	
17	Individual Sports	8	
18	Chores	9	7
19	Build Things	9	

Dendrogram Control Model

	Play - Sports and Family	DivCd	BoP
1	Arts or Crafts Activities	1	1
2	Family Sing	4	2
3	Nature Lessons	5	3
4	Recreational Sports	7	4
5	Family Games	7	
6	Playground Activities	7	
7	Family Sports	8	5
8	Sporting Event	8	
9	Sports Team	8	
10	Group Sports	8	
11	Individual Sports	8	
12	Chores	9	6
13	Build Things	9	

	Learning - Clubs, Lessons and Outings		
1	Arts or Crafts Lessons	1	1
2	Organized Clubs	2	2
3	Scouts/Daisies	2	
4	4H/Farm Clubs	2	
5	Dance Activities	3	3
6	Dance Lessons	3	
7	Organized Performing Arts	3	
8	Music Lessons	4	4
9	Visited Zoo or Aquarium	5	5
10	Visited a Museum	6	6
11	Concert, Play, or Show	6	

Figure 22: Revised Model Variables by Category, Diversity Code, and Breadth of Participation

Table 21 – Change in Social Competence Association Betas by Reassigning Activity

	Nature Lessons in the Family Category of Venue Model Sporting Event coded as Diverse Activity Type 6 - Outings												Nature Lessons in the Lessons Category of Venue Model Sporting Event coded as Diverse Activity Type 8 - Sports											
NSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
VENUE																								
LessonsAP	.043						.078		.056	.063			.046					.078	.068			.075		
CommunityAP						-.083												-.099						
FamilyAP				.062		.088	-.043			.052									-.042					

BNSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL																								
TotalAP	.058			.103			.039			.088			.051			.097						.105		
VENUE																								
LessonsAP	.051					.082	.081		.058				.055			.080		.121	.064			.071		
CommunityAP						-.115				.068								-.128						
FamilyAP				.072																				
IMPETUS																								
ExperienceAP		.036	-.036			-.085																		
TrainingAP	.042			.083		.117							.042	.038		.083		.087						
RecreationAP		-.079			-.082		.039	-.094		.095				-.085			-.082		.039	-.094		.095		
INVOLVEMENT																								
ParticipateAP	.040			.061						.087			.046			.073						.087		
ObserveAP	.035	.043		.073		.079												.080						
DENDROGRAM																								
LearningAP	.045						.049			.091			.045						.049			.091		
PlayAP				.065		.119										.074		.083		-.083				

Table 22 – Change in Reading Association Betas by Reassigning Activity

	Nature Lessons in the Family Category of Venue Model Sporting Event coded as Diverse Activity Type 6 - Outings												Nature Lessons in the Lessons Category of Venue Model Sporting Event coded as Diverse Activity Type 8 - Sports											
NSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
VENUE																								
LessonsAP	0.034		0.048				0.070		0.108				0.045	0.024	0.063				0.069		0.109	0.060	0.066	
CommunityAP																						-0.040	-0.056	
FamilyAP				-0.042	-0.060								-0.026		-0.028	-0.052	-0.064							

BNSAP	Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster			Overall Sample			Lower Cluster			Middle Cluster			Upper Cluster		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
TOTAL																								
TotalAP	0.024	0.026					0.053	0.058	0.043				0.025		0.033				0.046	0.038	0.054			
VENUE																								
LessonsAP	0.038	0.030	0.048				0.064		0.091				0.045	0.033	0.059				0.062		0.090	0.052	0.052	0.066
CommunityAP																								
FamilyAP				-0.037				0.046								-0.042	-0.058							
IMPETUS																								
ExperienceAP													-0.019			-0.035								
TrainingAP	0.028		0.038		-0.050		0.045		0.065	0.061		0.083	0.034		0.038		-0.050		0.045		0.065	0.061		0.083
RecreationAP										-0.039		-0.060										-0.039		-0.060
INVOLVEMENT																								
ParticipateAP	0.026	0.024	0.031				0.057	0.036	0.070				0.026	0.024	0.031				0.057	0.045	0.070			
ObserveAP								0.041								-0.038								
DENDROGRAM																								
LearningAP	0.020		0.030		-0.048		0.039		0.052				0.020		0.030		-0.048		0.039		0.052			
PlayAP																								

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