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Social Influences on Academic Motivation in Early Elementary School Students

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SOCIAL INFLUENCES ON ACADEMIC MOTIVATION IN EARLY ELEMENTARY SCHOOL STUDENTS.

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Abstract

SOCIAL INFLUENCES ON ACADEMIC MOTIVATION IN EARLY ELEMENTARY SCHOOL STUDENTS. Jenli Dawn Waters. Sponsored by Linda C. Mayes. Child Studies Center, Yale University, School of Medicine, New Haven, CT.

The goal of this research is to identify correlations between academic intrinsic motivation and exposures to academic activities within the home acknowledged by young children (5 to 8 years old). This study hopes to clarify relationship between academic intrinsic motivation and exposure to positive role modeling of academic activities in young children. Much of the data was collected by interview-style surveys conducted with a sample of 18 boys and girls of ages between 5 and 8 years. The Child-Reported Home Reading and Math Exposure Questionnaire (HEQ) was developed by the author for this study to assess the extent to which a child recognizes instances where reading and mathematics are positively modeled in the home and the extent to which that positive modeling conveys to the child the sense that those activities are enjoyable and important. It can be concluded from the data that children's exposure to positive reading role-models at home correlates significantly with academic intrinsic motivation for reading, math, and school in general. In contrast, children's exposure at home to positive math role-models did not correlate significantly to any of the measured areas of motivation, including math motivation.

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Table of Contents

Introduction

Motivation is the urge to act. It is of interest to anyone wanting to understand why organisms act as they do and anyone hoping to lead others to action. Insight into motivation is applicable for understanding behavior as diverse as the decisions of consumers, the enthusiasm with which students approach academics, and the dedication with which patients adopt treatment plans. Accordingly, it has been a subject for various scholars throughout history.

Roots of Modern Motivational Theory

In *The Republic*, Plato presented the hypothesis that human actions stem from one of three parts of the soul: reason, spirit, and appetite [1]. Plato's student, Aristotle, categorized motives for actions leading to either instrumental ends or final ends. According to Aristotle, instrumental ends are sought for the sake of other ends, while final ends are sought because they are desirable for their own sake [2]. Similarly, some psychologists currently describe motivation for a particular activity as either intrinsic or extrinsic. *Intrinsic motivation* describes the urge to participate in an activity in response to qualities inherent to participation. In contrast, *extrinsic motivation* describes the urge to participate in an activity for reasons distinct from participation itself. For example, a person might be intrinsically motivated to shower because it is pleasurably relaxing, or alternatively one might be extrinsically motivated to shower because they wish to be clean or satisfy social norms.

The concept of intrinsic or extrinsic motivation is founded upon the assumption that humans use inner thought processes to reason and actively make decisions which lead to

voluntary actions. This is a defining basic assumption of the cognitive theories of motivation. Cognitive theories can be classified within the general *organismic* approach to psychology, which assumes humans are active determiners of their behavior. In contrast to organismic approaches, *mechanistic* approaches (e.g. behaviorism) assume humans are passive and acted upon by various forces from within the individual or from the environment [3]. Cognitive theories have come to dominate the field motivation theory since the 1960s [4].

Prior to the 1960s, mechanistic theories such as Clark Hull's drive-reduction theory reigned as the leading theories on motivation. Clark Hull's drive-reduction theory represented one of the major theories of behaviorism and mechanistic approaches to psychology. As Robert White described it, by 1959 Hull's theory had "acquired a considerable air of orthodoxy" [5] (p297). According to Edward Deci, Hull's theory "was the first elaborate conception of motivation and has had the greatest impact on the field of motivation" [3] (p 12). As such, Hull's theory was the root of the hypotheses proposed by his students and colleagues [3].

In general, because behaviorism is founded on the philosophy that behavior should be explained entirely with observable data, behaviorists emphasize observable data, including schedules of reinforcements [3, 6]. Behaviorist theories, including drive-reduction theory, emphasize the reinforcement of links between stimuli and response, with little emphasis on cognitive thought processes which characterize cognitive theories [3], [4]. As one of the leading behaviorists, John B. Watson described psychology in the behaviorist view as a "purely objective experimental branch of natural science…introspection forms no essential part of its methods" [6] (p158). At an extreme,

behaviorists deny the role of motivation in behavior, since motivation is not an observable entity [7]. Hull's theory of drive-reduction is more moderate in this sense because it does entail internal links and internal agitated states in response to drive stimuli.

At its core, drive-reduction theory explains motivated behavior in terms of drives, drive-reduction as a reinforcement, and activation of links between stimuli and responses. A *drive* is a stimulus characterized by the onset of a deficit or need which promotes activity. Presumably, the need or deficit can be resolved after an appropriate consummatory response. Certain links are reinforced such that, for a given stimuli, the linked response becomes more likely to occur. One form of reinforcement is achieved through the reduction of a drive via a consummatory response that resolves the deficit or need that created the drive. Thus, motivation for a response arises chiefly from the drive stimulus. For example, hunger can be described as a drive arising from a need for food. If an organism eats in response to the hunger drive, the need for food is resolved and the drive is reduced. The reduction of the drive leads to reinforcement and a stronger link between the stimulus of hunger and the response of eating [3], [5].

Robert White's 1959 essay, "Motivation reconsidered: The concept of competence," marked the decline of mechanistic theories and the rise of cognitive theories. White elucidated behaviors which could not be motivated within the framework of drive-reduction theory [5]. Humans and animals seem motivated to participate in activities such as exploration, manipulation of objects, and general activity (e.g. physical exercise) without any apparent reinforcement. White grouped these activities thematically under the term *competence*, defined as "an organism's capacity to interact effectively with its

environment" [5] (p297). "Competence," he posits, "cannot be fully acquired simply through behavior instigated by drives…Such activities in the ultimate service of competence must therefore be conceived to be motivated in their own right" [5] (p 329). Thus, White highlighted the need to expand the concept of motivation to include obtaining satisfaction from participating in an activity for its own sake, without having to satisfy requirements for reinforcement under drive-reduction theory [5]. More investigations into cognitive theories, the nature of intrinsic motivation, and the nature of competence motivation soon followed.

Modern Motivational Theory: Self-Determination Theory

Cognitive theories attempt to explain the process by which people make decisions about how to behave based upon thought processes. Thus, cognitive theorists examine how people process information about their needs [3], [5], [8], select goals, and chose courses of behavior to achieve goals [3].

White's concept of competence motivation, also known as effectance motivation and mastery, was embraced by cognitive theorists such as Edward Deci [3], [9]. Deci developed self-determination theory (SDT) in his approach to human motivation and personality. Two subtheories of SDT address the topics of intrinsic and extrinsic motivation: cognitive evaluation theory (CET) [3] and organismic integration theory (OIT), respectively [10]. A person's motivation for activities may range from reluctance, to submissive compliance, to enthusiastic personal dedication. SDT suggests these variations represent differing degrees to which a person internalizes and integrates the regulation and value of an activity. The process of internalization and integration leads

to the sense that the activity is self-determined. Ryan and Deci conceptualize a continuum of motivation (see Figure 1) that is arranged in terms of the degree to which the motivation is self-determined. In this continuum, intrinsic motivation is the pinnacle of integrated and internalized motivation. Organismic integration theory, OIT, addresses the process of internalization and integration of non-intrinsically motivated behavior. Research supporting OIT suggests extrinsic motivation encompasses a continuum of motivation associated with a wide range of relative autonomy [10-12].

Within the continuum of extrinsic motivation, Ryan and Deci identify four levels of autonomy ascribed to the regulatory style directing the action: externalized, introjected, identified, and integrated. The apparent style of regulation for an action can be inferred from the reasons given by an individual for his or her actions as well as the perceived locus of causality [10]. The reasons and perceived locus of causality identified by an actor should not be confused with the cause of an action [12]. Externalized motivation is the least autonomous. An individual acting under external motives is characteristically acting solely to comply with rules and avoid punishment. A level of autonomy above externalized motivation is introjected motivation. Introjected motivation is characterized by acting for reasons related to maintenance of self-esteem and approval or avoidance of disapproval from others. Introjected motivation is more autonomous than externalized motivation because the desire for ego-enhancement is internally driven, but the perceived locus of causality is still somewhat external. In contrast, for identified motivation, the perceived locus of causality is somewhat internal. Actions stemming from identified motivation are defined as such because the individual recognizes the importance of the goal of the action and on this basis accepts the goal as one's own. Personal value is placed upon the goal itself with identified motivation. This represents distinctly

increased autonomy relative to introjection, which places value on the approval of other people who may recognize the importance of the goal. Finally, integrated motivation represents the most autonomous type of extrinsic motivation. Integrated goals are congruent with the person's other values and are incorporated into a person's sense of self. Integrated motivation and intrinsic motivation have many common qualities, but integrated motivation is still extrinsic because the desired goal is separable from the enjoyment of the activity for its own sake [10].

Research associated with self-determination theory (SDT) has focused upon innate human attributes and psychological needs that foster self-motivation, as well as the conditions that promote or hamper the degree to which motives are internalized. Ryan and Deci define a basic need as "an energizing state that, if satisfied, conduces toward health and well-being but, if not satisfied, contributes to pathology and ill-being" [10] (p74). In their consideration of the foundations for self-motivation, Ryan and Deci identify three psychological needs: competence [5], relatedness [13], and autonomy [3]. Ryan and Deci posit that internalization of motives is enhanced in conditions that better meet these three psychological needs, and conversely, that self-determined motivation is undermined in conditions in which these needs are poorly satisfied [10].

The CET sub-theory of SDT aims to identify causes of variability in intrinsic motivation. CET describes intrinsic motivation as an innate quality of humans that can be enhanced or diminished by conditions in the environment [14]. Because intrinsic motivation is considered an inherent human quality, SDT and CET are not concerned with causes of intrinsic motivation, but instead focus upon the conditions that alter it. Consistent with

the overarching SDT, CET calls attention to social environments in which innate psychological needs are either satisfied or not. Environments which support the needs for competence and autonomy have been linked to increased intrinsic motivation [15]. Research is also suggestive of the importance of satisfying the need for relatedness for improved intrinsic motivation [10].

Internalized versus externalized motives

The categorization of motivations along a spectrum of internalization, with intrinsic motivation representing the ultimate in internalized regulation, has led to numerous studies designed to characterize activities associated with variably internalized regulation and to elucidate methods of supporting autonomy and internalization. A theme has emerged to indicate that internalized motivation is associated with positive outcomes in various realms, including education [12] and health care [16-18], as well as religion [19], politics [20], environmentalism [21], and couples' intimate relationships [22].

In third to sixth-grade students, Ryan and Connell [12] examined external, introjected, identified, and intrinsic regulations and their relation to coping styles (i.e. positive, projection, denial, and anxiety amplification), anxiety, effort, and enjoyment. The non-external regulations positively related to positive coping style. Conversely, denial and projection were more often related to external regulation, and projection was negatively correlated with identified regulation. Anxiety amplification and anxiety was most closely linked to introjected regulation. This is expectedly due to the self-esteem-based concerns defining introjected regulation. Self-reported effort correlated positively with the non-external regulations and remained uncorrelated with external regulation. Reports of enjoyment paralleled increasingly autonomous regulation, with intrinsic regulation

proving to be the most strongly associated with enjoyment [12]. Greater internalization of academically related motives was found among children of parents who provide more support of autonomy [23]. Even among medical students, instructors with autonomy-supportive teaching styles promoted greater internalization of biopsychosocial values [24].

The concept of autonomy and internalization of motives has also proven to be medically important, specifically for treatment adherence by substance-addicted, chronically ill, or obese patients. In the setting of outpatient treatment for alcoholism, patients with internalized motivation demonstrated greater involvement and retention within the treatment program. Patients with little internalized motivation demonstrated the poorest response to treatment, despite their level of external motivation [16]. Chronically ill patients with a greater sense of autonomous motivation and physicians' autonomy support demonstrated greater adherence to medication regimen [17]. Similarly, during 6-month low-calorie weight-loss program and the following 23-month period, severely obese patients with more autonomous motivation for weight loss demonstrated more regular program attendance, more weight loss during the program, and greater maintenance of lost weight. Furthermore, autonomous motivation for weight loss was predicted by the perceived autonomy supportiveness of the health-care staff [18].

Feelings of vitality were enhanced when one was working under autonomous motivation relative to working under externally controlling conditions [25]. In general, the degree of importance placed by an individual on intrinsic or extrinsic aspirations in life relates to measures of well-being, such as self-actualization, vitality, and the inverses of depression, anxiety, and physical symptoms. Focus upon extrinsic aspirations, including

wealth, an attractive appearance, and fame, correlated with lower measures of well-being. Conversely, orientation toward intrinsic aspirations, including self-acceptance, personal growth, and physical health, correlated with higher measures of well-being [26].

Intrinsic Motivation

The association of intrinsic motivation with autonomous regulation and various desirable traits and outcomes offers compelling reason for further examination of intrinsic motivation itself.

In a sample of nearly 800 3rd-grade through 8th-grade children, intrinsic and extrinsic motivation were found to be moderately correlated. In this group, intrinsic motivation decreased in a linear fashion as grade level increased, while extrinsic motivation remained relatively stable across grade level [27]. In elementary and junior high school students, extrinsic motivation was negatively correlated with academic achievement measured by grade-point average (GPA) and standardized test scores, whereas intrinsic motivation was positively correlated with academic achievement [27], [28]. In elementary and junior high school students, academic intrinsic motivation correlated positively with children's perceptions of academic competence. In this population, academic intrinsic motivation correlated negatively with academic anxiety [28]. Furthermore, in fifth-graders at least, intrinsic motivation correlated with improved conceptual learning [29].

On the other hand, another study of high school students' intrinsic motivation while studying did not predict grades. However, for high school students identifying with a particular area of talent, intrinsic motivation while studying was associated with progress

in that area of talent. No relationship was found between motivation for long-term scholastic goals and intrinsic motivation while studying in these high school students. Intrinsic motivation while studying did relate to the selection of difficult courses, especially early in high school when the external pressures of college requirements were minimal [30].

Self-determination theorists, in their regard for the psychological needs autonomy and competence in fostering intrinsic motivation, have examined intrinsic motivation in environments designed to support autonomy and competence. Teachers who forsake controlling habits and create an autonomy supportive environment see greater intrinsic motivation in their students [15, 31]. In addition, lower levels of intrinsic motivation correlated with teachers who were perceived as cold and uncaring [15].

Intrinsic Motivation and Extrinsic Rewards

Numerous studies have explored the effect of extrinsic rewards on an individual's intrinsic motivation. An "overjustification effect" has been described, in which there is a decrease of intrinsic motivation after an individual is induced to participate an activity for extrinsic reasons [32]. It follows that once the extrinsic motivators are eliminated, overall motivation for the activity, which now consists solely of intrinsic motivation, will be lower than it was prior to the introduction of the extrinsic motivator. This has led to a common perception that extrinsic incentives diminish an individual's motivation for life-long learning, while intrinsic motivation produces durable commitments to learning [33]. Investigations of the overjustification effect have been at odds, with published evidence for [3, 32, 34, 35] and against its existence [36, 37]. Meta-analytic studies have similarly been at odds, with some results in support of the overjustification effect [38], [39] and

others showing no such effect [40], resulting in much discussion and debate [41-44]. The outcome of the debate over the existence and nature of the overjustification effect is of particular interest to economists attempting to assess the "hidden costs" of offering an extrinsic reward [45], as well as parents and educators [33].

One of the classic [45] early sets of experiments indicating that extrinsic contingent rewards undermine intrinsic motivation was published by Deci [3, 34, 35]. In these experiments, college students were given an interesting puzzle solving task and told that they were participating in an experiment about problem solving. After a few sessions of working with the puzzle, each study subject was left in the session room with the puzzle task and other items (e.g. magazines) for a period of free-time, and the experimenter took measures to give the study subject the impression of being unobserved. Some of the study subjects were paid as a reward for their participation and others were unpaid for their participation. The study subjects in the unpaid group occupied more of the free time period with the puzzle and reported being more interested in the puzzle task than their paid counterparts [3]. The overjustification effect was similarly suggested by experiments with high school students and preschool children [32].

Intrinsic Motivation and Verbal Feedback

Short of tangible offers of money and prizes as rewards for desired behavior, there is praise. Because praise may be construed as an extrinsic reward [46], it is not surprising that evidence regarding the effect of praise on intrinsic motivation is similarly conflicting, and many studies of praise overlap studies of extrinsic reward. Evidence abounds for both sides of the argument. In some cases it appears praise is helpful for fostering intrinsic motivation [35, 40, 47-50]. In other cases it appears harmful or

without effect [51]. In fact, some evidence indicates that negative feedback, as well as positive feedback, increases intrinsic motivation [50], although other studies assert that positive feedback increases intrinsic motivation to a greater degree than negative feedback [52].

Henderlong and Lepper [46] suggest refining the many variable qualities that characterize praise to obtain a clearer picture of its effect on intrinsic motivation. They emphasize qualities of praise such as sincerity and the degree to which the praise conveys reasonable expectations and supports competence and autonomy. For a given act, Self-Determination theorists argue that any event, including receiving rewards or feedback, that enhances feelings of competence and autonomy will enhance intrinsic motivation [10, 11, 53]. Vallerand and Reid [47] demonstrated that positive feedback enhanced intrinsic motivation as well as perceived competence, while negative feedback seemed to diminish both.

Measures of Intrinsic Motivation

Two general strategies for measuring intrinsic motivation are commonly employed [11]. One strategy involves observing the amount that a study subject engages in the activity in question during a period of free time. Classically, the study subject is secretly observed alone in the experimental room with the target activity as well as a choice of assorted distracting activities. The time a study subject chooses to engage in the target activity during the free time period should indicate the level of intrinsic motivation [3, 35]. Another strategy involves study subject self-reports of interest and enjoyment of the activity in question [54, 55]. A variation of this strategy, termed the Experience Sampling Method (ESM), utilizes serial self-reports pertaining only to the present time-

point which are completed on random occasions during the study subjects' waking hours. Sometimes, the study subjects carry a pager which notifies them to complete a self-report. Thus, ESM minimizes the effects of reconstruction and faulty memory recall. [56, 57].

Gottfried developed self-report style measures for academic intrinsic motivation in children and young children called Children's Academic Intrinsic Motivation Inventory (CAIMI) and Young Children's Academic Intrinsic Motivation Inventory (YCAIMI), respectively [55, 58]. The measures differentiate subject areas of motivation, such as reading and math. Studies using this method of measuring distinct motivations for subject areas have detected differentiated relationships between motivation and perceptions of competence and anxiety based upon subject area. For example, academic intrinsic motivation for math seems to be distinctively associated with math achievement [28]. The YCAIMI is one of the key measures used in the present study.

Goal of research

The goal of this research is to identify correlations between academic intrinsic motivation and exposures to academic activities within the home acknowledged by young children (5 to 8 years old). Particular attention is directed toward the role models visible in the home, including parents, family friends, and television characters, and whether their participation in academic activities conveys to children the sense that those activities are important and enjoyable. This study hopes to clarify relationship between academic intrinsic motivation and exposure to positive role modeling of academic activities in young children. A positive correlation is expected between reading exposure in the home

and reading academic intrinsic motivation. A positive correlation is also expected between math exposure in the home and math academic intrinsic motivation.

Methods

Subjects

A group of 18 children participated in this study. The children were recruited from a group of 28 children enrolled in the Footebridge program, a summer school program for public school kindergartners and first graders in New Haven, Connecticut provided at no cost to participants. Invitation to enroll in Footebridge was by lottery. All kindergartners at one New Haven public school were invited to enter the lottery, and selections for invitation were drawn from the respondents. The program spans two summers, with a six-week session each summer. The broad curriculum includes "reading, writing, math, science, art, singing, dramatic play, library visits, field trips, cooking, and plenty of outdoor exploration." The program is designed to provide an engaging environment and plentiful teacher attention, with a teacher-to-student ratio of 1:3. Reading workshops are carefully paced over the course of an hour-and-a-half period during which teachers work with small groups on a variety of tasks including "oral language, decoding, phonics, writing, comprehension."

The 18 children participating in this study included 11 girls and 7 boys. Ages of the children ranged from 5 years and 8 months (68 months) to 7 years and 4 months (88 months), with an average age of 6 years and 5 months (76.2 months, s.d. 6.6). The average age for boys was 77.1 months (s.d. 4.8) and for girls, 75.5 (s.d. 7.8). All children

were fluent in English. Five children in this study were attending their second summer session, while 14 children were attending their first session

Procedures

Children enrolled in the study group participated in a series of interviews and questionnaires. Data for the Vineland Adaptive Behavior Scales and Early Screening Profiles (ESP) were gathered by a qualified member of the research team other than the author of this paper. Vineland survey results are available for 3 of the boys and 5 of the girls enrolled in the study. The cognitive/language profile results from the ESP are available for 5 of the boys and 7 of the girls from the subject pool.

Data for the Young Children's Academic Intrinsic Motivation Inventory (YCAIMI) and the Child-Reported Home Reading and Math Exposure Questionnaire ("Home Exposure Questionnaire" or HEQ) were gathered individually for each child in a single session by the author with the aid of trained research assistants. Prior to each administration of the YCAIMI and HEQ, the children were informed that the questions were not part of a test and that their answers would be confidential and would not affect their grades. They were furthermore encouraged to provide honest answers. They were asked not to discuss their answers with other children in their class. They were also informed that they would be offered stickers for completing the survey. During the survey, children were presented with three index cards with thermometers indicating the maximum, midway, and minimum positions which would correspond with the "very true," "a little true," and "not true" answer choices so children could respond verbally or by pointing to the card. Children were given two practice questions, and they were encouraged to ask questions of the interviewer as needed to clarify survey items. At the conclusion of the YCAIMI

and Child-Reported Home Reading and Math Exposure Questionnaire session, each child was offered stickers from an assortment as a prize for completion of the survey. Administration time was approximately 30-45 minutes.

Measures

Vineland Adaptive Behavior Scales

The Vineland Adaptive Behavior Scale [59] for parents and teachers is a norm-referenced measure of personal and social sufficiency from birth to 19 months of age that uses a semi-structured interview format. The Vineland is scored for four domains--communication, daily living skills, socialization, and motor skills--which are combined into the Adaptive Behavior composite, an assessment of overall adaptive behavior. Extensive research investigations have demonstrated excellent levels of reliability for each domain and sub-domain and good-to-excellent reliability for the majority of individual items as well as good evidence for construct validity.

For the purposes of this study, the domains of communication, daily living skills, and socialization were assessed.

Early Screening Profiles (ESP)

The Early Screening Profiles (ESP) [60] are a comprehensive screening instrument for children within the age range of 2 years and 0 months to 6 years and 11 months. The instrument consists of three profiles: cognitive/language profile, motor profile, and self-help/social profile. The cognitive/language profile is separated into a cognitive scale for non-verbal skill assessment and a language scale for verbal skill assessment. Cognitive/language profile tasks measure an individual child's reasoning skills, visual

organization and discrimination, receptive and expressive vocabulary, and basic school skills. The mean subscale score is 100 with a standard deviation of 15.

Young Children's Academic Intrinsic Motivation Inventory (Y-CAIMI)

The Y-CAIMI has proven to be a reliable and valid instrument for the measurement of intrinsic motivation in young children. The Y-CAIMI was adapted from the Children's Academic Intrinsic Motivation Inventory (CAIMI) for use with young children by simplifying the response format and language and making the inventory shorter with fewer items and subject areas. The response format was simplified from a 5-point Likert scale in the CAIMI to a 3-point Likert scale ranging from *Very True* to *A Little True*, to *Not True*. The Y-CAIMI survey covers three subscales corresponding to three subject areas: reading, math, and general. The Y-CAIMI also includes a "Difficult Scale" composed of one additional question in each of the three subscale subject area surveys. For this study, the responses to the "Difficult Scale" questions for each subject area were integrated with the 12 items routinely included in the subscale score, such that each subscale had a total of 13 questions with a minimum possible score of 13 and a maximum possible score of 39. To reduce response acquiescence, *Very True* corresponded to higher intrinsic motivation for some items and lower intrinsic motivation for other items. On each of the three subscales, *Very True* corresponds to higher intrinsic motivation for 8 items and to lower intrinsic motivation for 5 items. Children were shown to be capable of using the *Very True* to *Not True* responses appropriately without acquiescence [55].

Child-Reported Home Reading and Math Exposure Questionnaire

The Child-Reported Home Reading and Math Exposure Questionnaire (HEQ) was developed by the author for this study to assess the extent to which children recognize

that reading and mathematics are positively modeled in the home. Items are included to measure the amount of exposure to reading and mathematics children recognized from sources within the home. Items are also included to assess the degree to which the reported exposure conveys a sense that reading and mathematics are important and enjoyable. Sources of exposure specified in the survey included parents, television, and family friends. The Questionnaire included 25 items, including 18 topic-specific items: 9 items assessing reading exposure and 9 items assessing math exposure. Only the 18 topic-specific items were scored for this study. Within the topic-specific sets of questions, 2 items were *Yes* or *No* questions and 7 items had a response format of a 3-point Likert scale ranging from either *A Lot* to *Some* to *None* or *Very True* to *A Little True* to *Not True*. The remaining items were not scaled and inquired about specific television shows watched and favorite television shows. The minimum possible score for the HEQ is 7, and the maximum possible score is 24. This survey form is included in the Appendix.

Results

Mean Y-CAIMI and HEQ Scores

The mean scores for academic intrinsic motivation for reading, math, and general subscales as measured by the Y-CAIMI are displayed in Table 1 and charted on Figure 2, along with the mean scores for home reading exposure and home math exposure as measured by the HEQ. Mean scores for each gender are similar on all scales, except for the home reading exposure, for which the mean female score was 18.9, while the mean male score was 15.8.

Correlations between YCAIMI and HEQ Variables

Correlation coefficients for the YCAIMI subscale scores for reading, math, and general motivation and the HEQ subscale scores for reading and math exposure are displayed in Table 2. Scatter plots for pairs of variables with significant correlation coefficients are available in Figures 3-6. Academic intrinsic motivation for reading is highly correlated with academic intrinsic motivation for math and for school in general. The children's reported exposure to reading in the home correlated positively and significantly with all three types of academic intrinsic motivation, that is, motivation for reading, for math, and for school in general. The children's reported exposure to reading in the home correlated positively and significantly with their reported home exposure to mathematics. The children's reported exposure to math in the home did not correlate significantly with any variable other than reported exposure to reading in the home. Though not statistically significant, the data suggest a minor positive correlation between reported exposure to math in the home and all areas of motivation. Of the three areas of motivation, motivation for reading correlated most strongly with reported exposure to math in the home.

Mean Vineland Scores

The mean values for the Communication, Daily Living Skills, Socialization, and Adaptive Behavior Composite scores from the Vineland Adaptive Behavior Scale are displayed in Table 3 and Figure 3. All children scored within the normal range, and the mean values reflect this. Among these children, the average scores for the 5 girls exceeded the scores for the 3 boys on all scales. Analysis of variance (ANOVA) indicates that the gender difference between the mean score on the Adaptive Behavior

Composite is significant at the 0.019 level. ANOVA also indicates the gender difference for the mean Communication scores is significant at the 0.071 level, and the gender difference for the mean Daily Living Skills scores is significant at the 0.063 level. The gender difference for the mean Socialization scores is only significant at the 0.131 level. The ANOVA results are displayed in Table 4.

Correlations between Y-CAIMI, HEQ, and Vineland Variables

The correlation coefficients for Y-CAIMI motivation scores, HEQ scores, and Vineland subscale scores are displayed in Table 2. Within the group of 8 subjects for whom Vineland Adaptive Behavior Profiles scores were available, none of the Pearson Correlation Coefficients between the Vineland Subscales and the Y-CAIMI or HEQ variables reach statistical significance. Although not statistically significant, the figures are notable for the suggestion of negative correlations between Vineland Socialization Subscale Scores and academic intrinsic motivation for math, reading, and school in general, as well as negative correlations between Socialization and exposure to positive modeling of math and reading in the home as measured by the HEQ. The figures also suggest a negative correlation between exposure to positive role-modeling of math in the home and adaptive behavior quantified by the Vineland's Communication, Socialization, and Composite scores.

Mean Early Screening Profile (ESP) Scores

Mean scores for the Early Screening Profile Cognitive and Language Subscales are displayed in Table 5 and Figure 4. These scores are available for 12 of the subjects enrolled in this study. Within these 12, the overall mean Cognitive Subscale score was 91.33, and the overall mean Language Subscale score was 96.67. The mean score for

girls in this sample exceeded the mean for boys by about 6 points on the Cognitive Subscale and 5.6 points on the Language Subscale.

Correlations for Y-CAIMI, HEQ, and Early Screening Profile (ESP) Variables

Correlation coefficients for Y-CAIMI, HEQ, and Early Screening Profile Variables are displayed in Table 6. Data does not suggest any correlation between ESP variables and Y-CAIMI variables or HEQ variables.

Discussion

This study has revealed complex patterns of correlation between several variables and young children's reports of their exposure at home to positive role-modeling of various academic subject areas. The lack of correlation between cognitive/language skills and intrinsic motivation supports the notion that intrinsic motivation is a separable entity that does not necessarily translate to skills in young children. Also, the data reveal no correlation between cognitive/language skills and exposure to positive reading or math role-models in this group of young children.

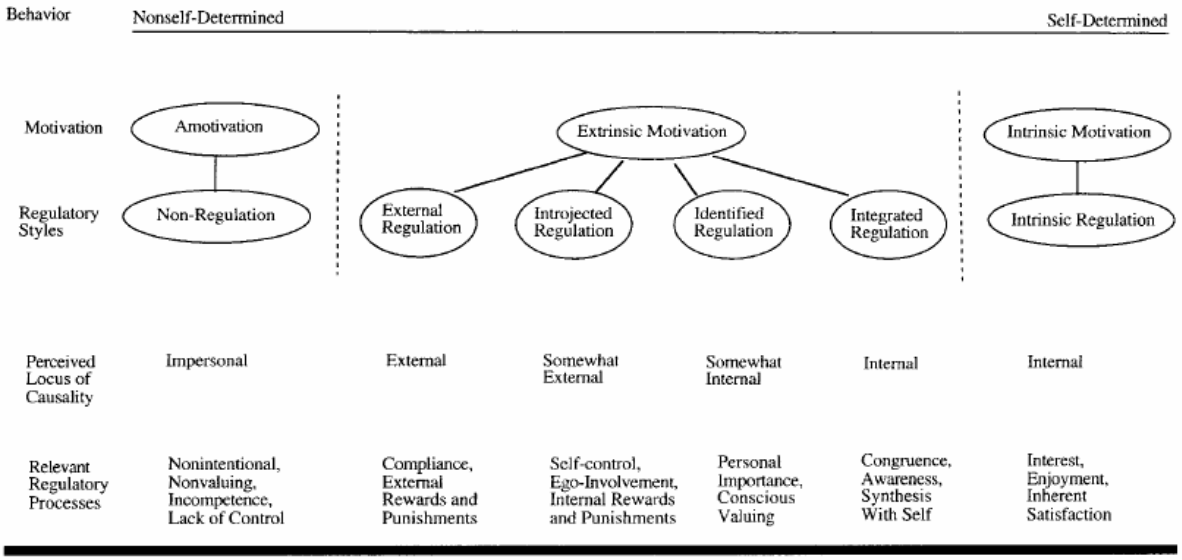
Though correlations with the Vineland subscales did not reach statistical significance, likely due to the limited sample size, some interesting trends in the data may direct further investigation. Socialization as measured by the Vineland correlated negatively with reading, math, and general academic intrinsic motivation. Socialization also correlated negatively with reading and, most strongly, with math exposure. In other words, this preliminary data suggests all types of academic intrinsic motivation and role-modeling of academic activities in the home are associated with poorer socialization skills. Administration of the Vineland, Y-CAIMI, and HEQ to a larger sample size may

help confirm or dispel this preliminary evidence.

It can be concluded from the data that children's exposure to positive reading role-models at home correlates significantly with academic intrinsic motivation for reading, as expected. Children's reading exposure at home also correlates positively and significantly with intrinsic motivation for math and school in general. In contrast, children's exposure at home to positive math role-models surprisingly did not correlate significantly to any of the measured areas of motivation, including math motivation. Given that reading often forms the foundation for learning in the classroom, it is not surprising that a child exposed to enthusiastic readers at home might develop broad interests and intrinsic motivation in all areas of academics. Alternatively, it is not surprising that a child who is an enthusiastic intrinsically motivated student might notice and seek role-models who read. It is, however, surprising that positive exposure to math in the home does not at least correlate to math motivation. The reason for this simply may be that the sample size for this study may be too small to demonstrate any existing correlation at an appreciable level of significance. It is also possible that intrinsic motivation for math is not an entity that is as easily socially influenced as intrinsic motivation for reading, such that the effects of role-modeling pale for math in comparison to reading. This lack of correlation also suggests that any effect on achievement from exposure to math in the home does not stem from fluctuations in intrinsic motivation. While no causal relationships have been established, this study concludes that there is a significant relationship between positive reading role-models and academic intrinsic motivation, but the relationship between role-modeling and intrinsic motivation is not uniform for different academic subject areas.

Tables and Figures

Figure 1
The Self-Determination Continuum Showing Types of Motivation With Their Regulatory Styles, Loci of Causality, and Corresponding Processes

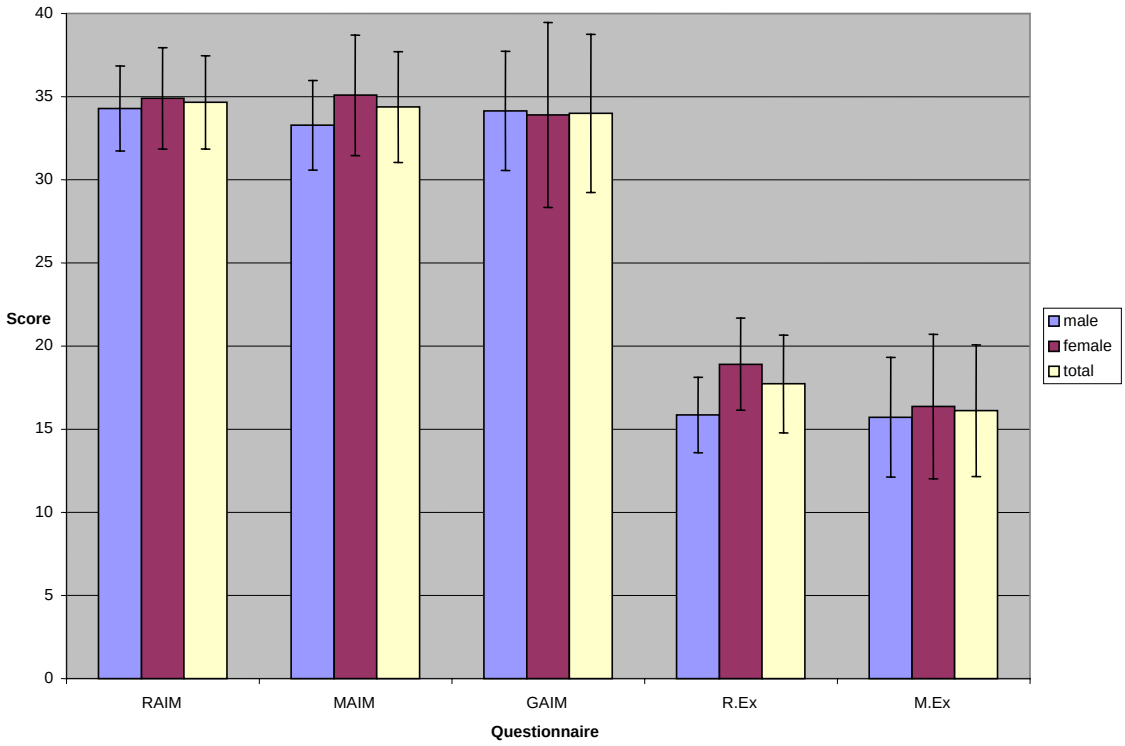


[10]

Table 1: Mean Y-CAIMI and HEQ Scores

		RAIM	MAIM	GAIM	R.Ex	M.Ex
male	Mean	34.2857	33.2857	34.1429	15.8571	15.7143
	N	7	7	7	7	7
	S.D.	2.56348	2.69037	3.57904	2.26779	3.59232
female	Mean	34.9091	35.0909	33.9091	18.9091	16.3636
	N	11	11	11	11	11
	S.D.	3.0481	3.61814	5.55796	2.77325	4.34218
Total	Mean	34.6667	34.3889	34	17.7222	16.1111
	N	18	18	18	18	18
	S.D.	2.80755	3.32794	4.76507	2.94669	3.96883

Figure 2: Mean Y-CAIMI and HEQ Scores



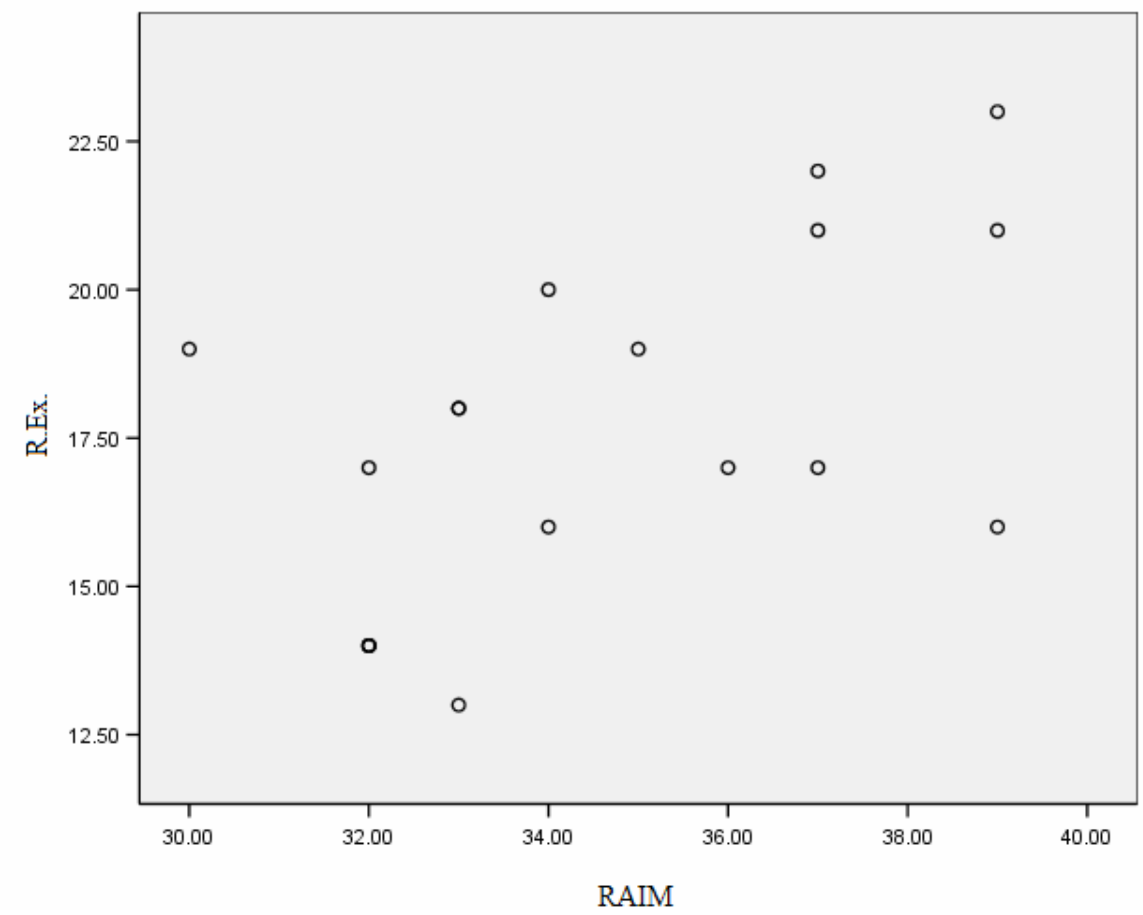
RAIM = Reading - Academic Intrinsic Motivation (measured with Y-CAIMI)
MAIM = Math – Academic Intrinsic Motivation (measured with Y-CAIMI)
GAIM = General – Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)
M.Ex = Math Exposure (measured with HEQ)

Table 2: Correlations between Y-CAIMI motivation scores, HEQ exposure scores, and Vineland scores

		RAIM	MAIM	GAIM	R.Ex	M.Ex	Comm	DLS	Soc	ABC
RAIM	r	1	.600(**)	.686(**)	.550(*)	.336	.105	.003	-.421	-.100
	Sig. †		.008	.002	.018	.173	.804	.994	.299	.814
	N	18	18	18	18	18	8	8	8	8
MAIM	r	.600(**)	1	.712(**)	.564(*)	.255	.258	.110	-.345	-.112
	Sig. †	.008		.001	.015	.307	.538	.795	.402	.791
	N	18	18	18	18	18	8	8	8	8
GAIM	r	.686(**)	.712(**)	1	.499(*)	.218	-.014	-.122	-.389	-.187
	Sig. †	.002	.001		.035	.385	.974	.774	.341	.658
	N	18	18	18	18	18	8	8	8	8
R. Ex.	r	.550(*)	.564(*)	.499(*)	1	.586(*)	.091	.117	-.217	.133
	Sig. †	.018	.015	.035		.011	.830	.783	.606	.754
	N	18	18	18	18	18	8	8	8	8
M. Ex.	r	.336	.255	.218	.586(*)	1	-.525	.196	-.468	-.527
	Sig. †	.173	.307	.385	.011		.181	.641	.243	.180
	N	18	18	18	18	18	8	8	8	8
Comm	r	.105	.258	-.014	.091	-.525	1	.460	.681	.835(**)
	Sig. †	.804	.538	.974	.830	.181		.251	.063	.010
	N	8	8	8	8	8	8	8	8	8
DLS	r	.003	.110	-.122	.117	.196	.460	1	.514	.534
	Sig. †	.994	.795	.774	.783	.641	.251		.192	.173
	N	8	8	8	8	8	8	8	8	8
Soc	r	-.421	-.345	-.389	-.217	-.468	.681	.514	1	.902(**)
	Sig. †	.299	.402	.341	.606	.243	.063	.192		.002
	N	8	8	8	8	8	8	8	8	8
ABC	r	-.100	-.112	-.187	.133	-.527	.835(**)	.534	.902(**)	1
	Sig. †	.814	.791	.658	.754	.180	.010	.173	.002	
	N	8	8	8	8	8	8	8	8	8

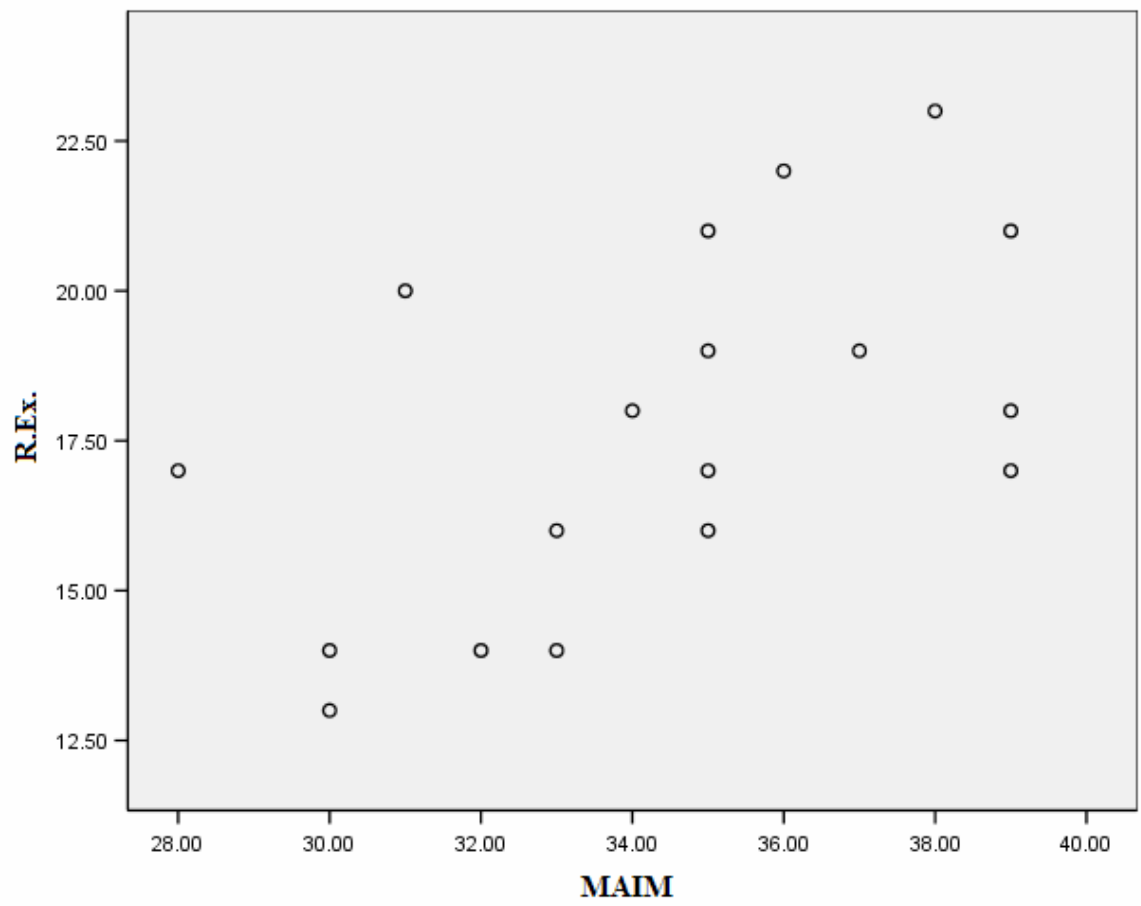
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Sig. † = Significance (2-tailed)
r = Pearson Correlation Coefficient
RAIM = Reading - Academic Intrinsic Motivation (measured with Y-CAIMI)
MAIM = Math – Academic Intrinsic Motivation (measured with Y-CAIMI)
GAIM = General – Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)
M.Ex = Math Exposure (measured with HEQ)
Comm = Communication (Vineland)
DLS = Daily Living Skills (Vineland)
Soc = Socialization (Vineland)
ABC = Adaptive Behavior Composite (Vineland)

Figure 3: Scatter Plot - Reading Academic Intrinsic Motivation and Reading Exposure



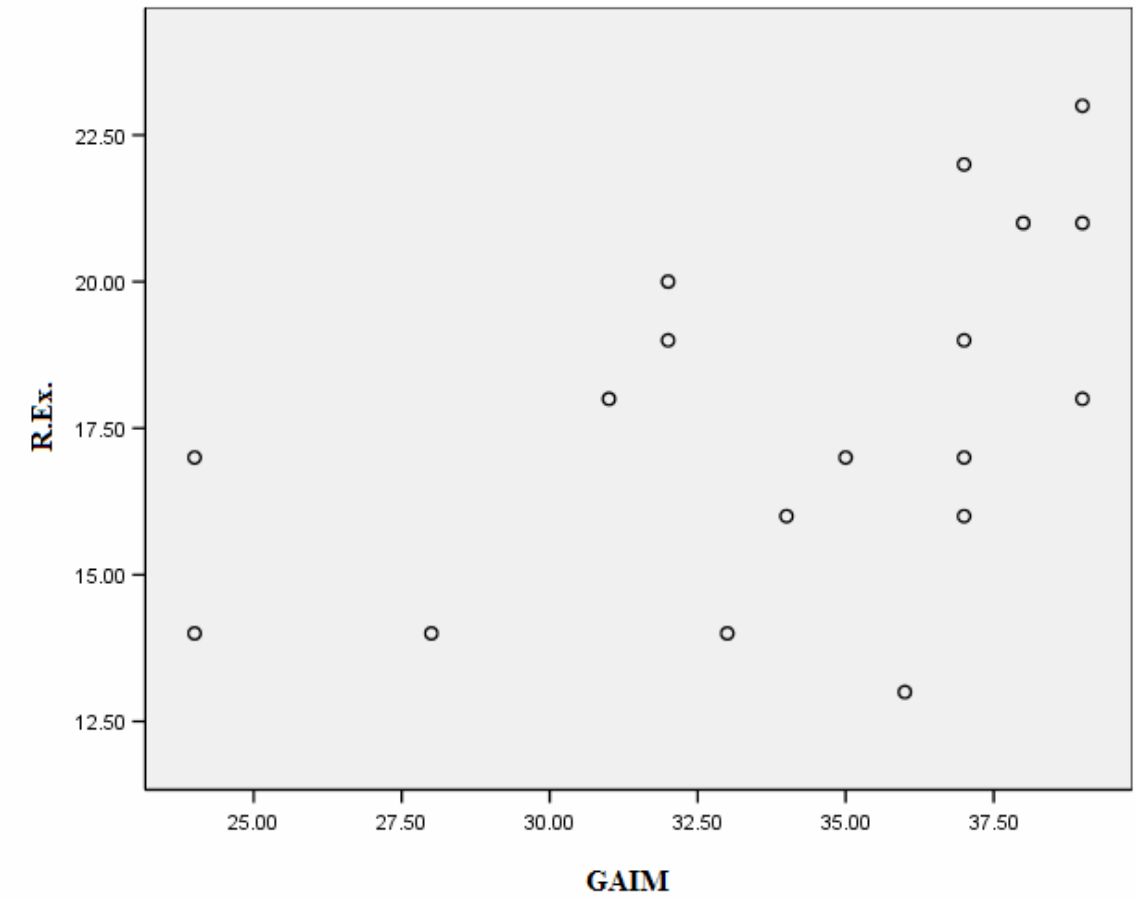
RAIM = Reading - Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)

Figure 4: Scatter Plot – Math Academic Intrinsic Motivation and Reading Exposure



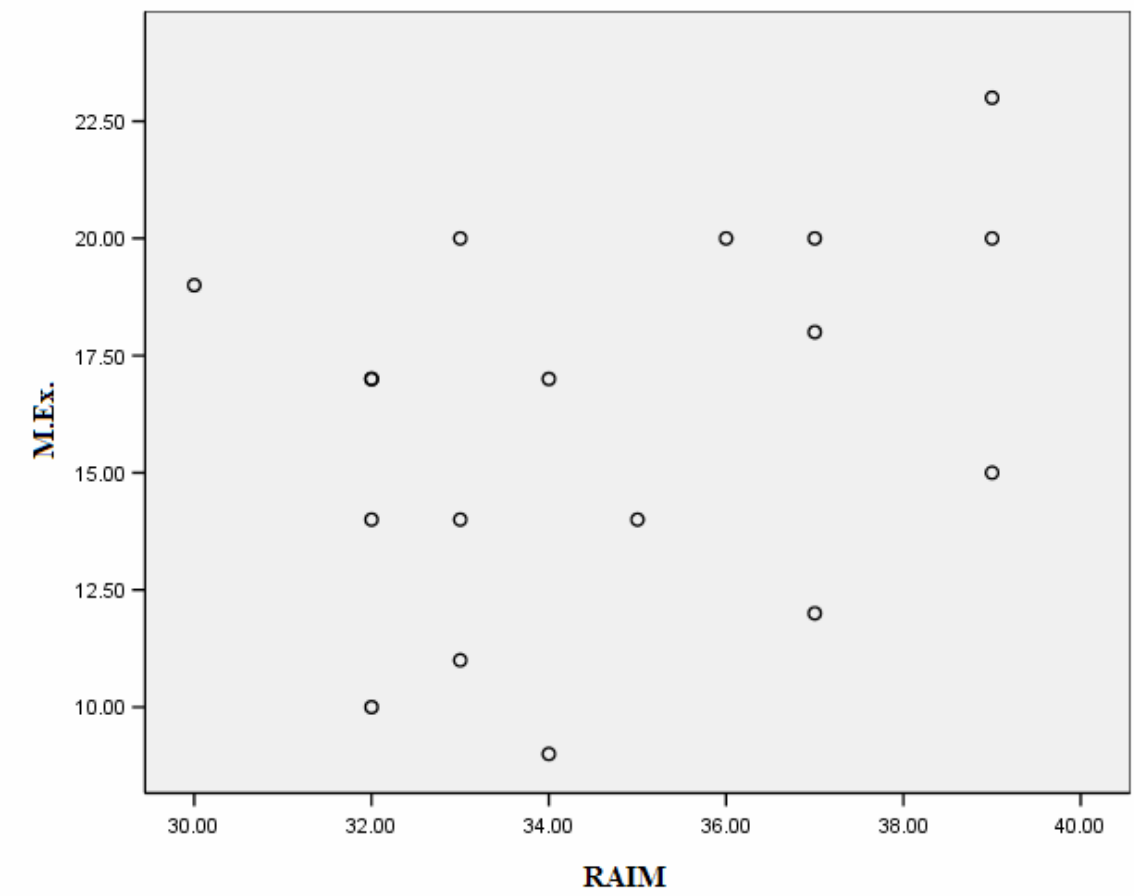
MAIM = Math – Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)

Figure 5: Scatter Plot – General Academic Intrinsic Motivation and Reading Exposure



GAIM = General – Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)

Figure 6: Scatter Plot – Reading Academic Intrinsic Motivation and Math Exposure

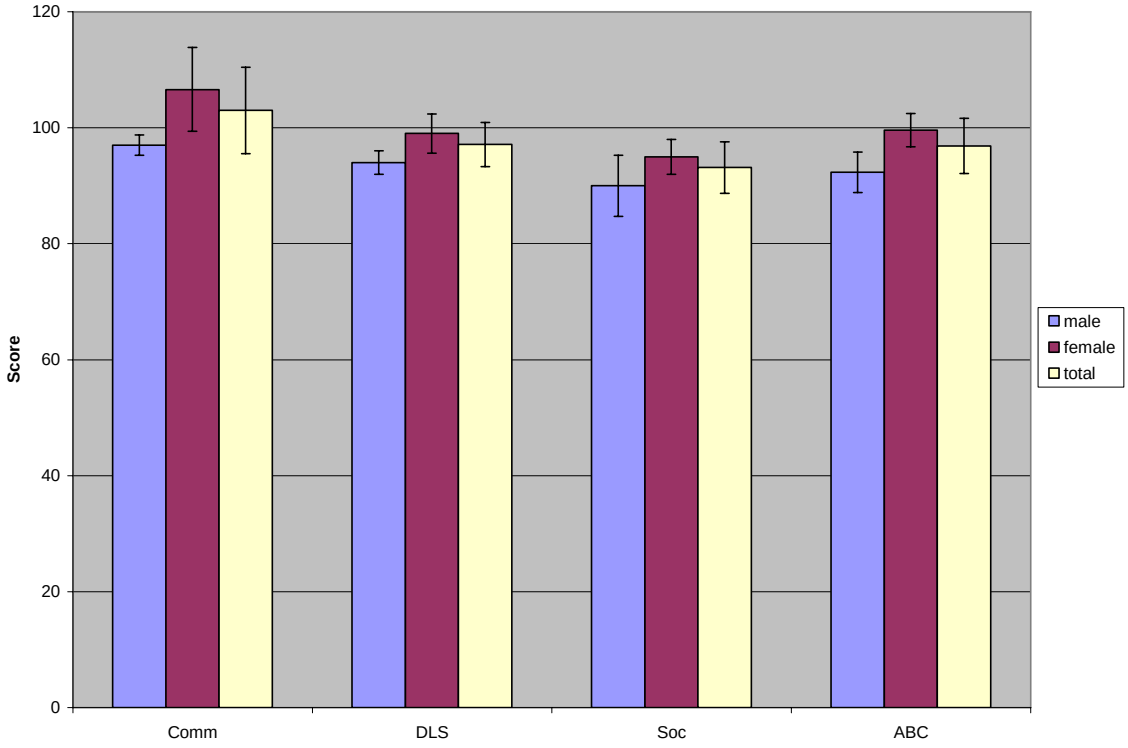


RAIM = Reading - Academic Intrinsic Motivation (measured with Y-CAIMI)
M.Ex = Math Exposure (measured with HEQ

Table 3: Mean Vineland Scores

		Comm	DLS	Soc	ABC
Male	Mean	97.00	94.00	90.00	92.33
	N	3	3	3	3
	S.D.	1.732	2.000	5.292	3.512
Female	Mean	106.60	99.00	95.00	99.60
	N	5	5	5	5
	S.D.	7.232	3.391	3.000	2.881
Total	Mean	103.00	97.13	93.13	96.88
	N	8	8	8	8
	S.D.	7.445	3.796	4.454	4.734

Figure 7: Mean Vineland Scores



Comm = Communication (Vineland)
DLS = Daily Living Skills (Vineland)
Soc = Socialization (Vineland)
ABC = Adaptive Behavior Composite (Vineland)

Table 4: Analysis of Variance for Vineland Means by Gender

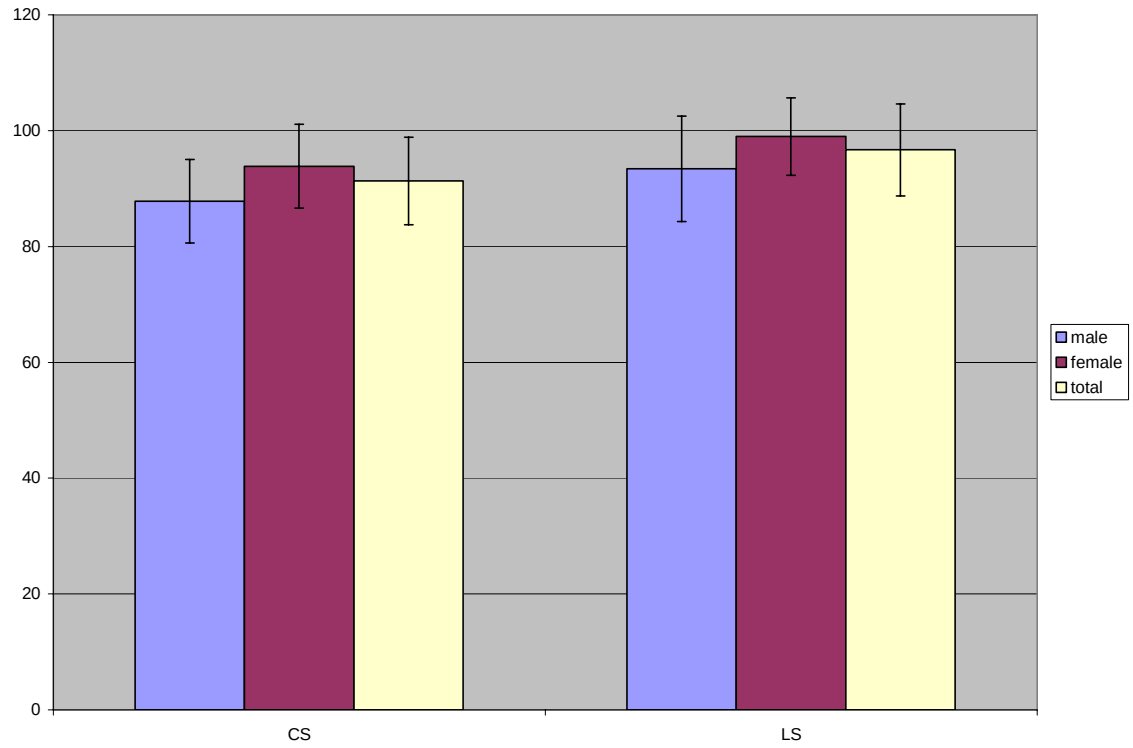
			Sum of Squares	df	Mean Square	F	Sig.
Comm * Gender	Between Groups	(Combined)	172.800	1	172.800	4.818	.071
	Within Groups		215.200	6	35.867		
	Total		388.000	7			
DLS * Gender	Between Groups	(Combined)	46.875	1	46.875	5.208	.063
	Within Groups		54.000	6	9.000		
	Total		100.875	7			
Soc * Gender	Between Groups	(Combined)	46.875	1	46.875	3.057	.131
	Within Groups		92.000	6	15.333		
	Total		138.875	7			
ABC * Gender	Between Groups	(Combined)	99.008	1	99.008	10.266	.019
	Within Groups		57.867	6	9.644		
	Total		156.875	7			

Comm = Communication (Vineland)
DLS = Daily Living Skills (Vineland)
Soc = Socialization (Vineland)
ABC = Adaptive Behavior Composite (Vineland)

Table 5: Early Screening Profile – Mean Cognitive and Language Subscale Scores

		CS	LS
male	Mean	87.80	93.40
	N	5	5
	S.D.	7.225	9.099
female	Mean	93.86	99.00
	N	7	7
	S.D.	7.221	6.683
Total	Mean	91.33	96.67
	N	12	12
	S.D.	7.560	7.924

Figure 8: Early Screening Profile – Mean Cognitive and Language Subscale Scores



CS = cognitive subscale (Early Screening Profile)
LS = language subscale (Early Screening Profile)

Table 6: Correlations between ESP, Y-CAIMI, and HEQ variables

		CS	LS	RAIM	MAIM	GAIM	R.Ex	M.Ex
CS	r	1	.365	-.034	.003	.007	.208	-.283
	Sig. †		.244	.916	.992	.983	.516	.373
	N	12	12	12	12	12	12	12
LS	r	.365	1	.143	.121	.078	.199	.088
	Sig. †	.244		.658	.708	.809	.536	.786
	N	12	12	12	12	12	12	12
RAIM	r	-.034	.143	1	.600(**)	.686(**)	.550(*)	.336
	Sig. †	.916	.658		.008	.002	.018	.173
	N	12	12	18	18	18	18	18
MAIM	r	.003	.121	.600(**)	1	.712(**)	.564(*)	.255
	Sig. †	.992	.708	.008		.001	.015	.307
	N	12	12	18	18	18	18	18
GAIM	r	.007	.078	.686(**)	.712(**)	1	.499(*)	.218
	Sig. †	.983	.809	.002	.001		.035	.385
	N	12	12	18	18	18	18	18
R. Ex.	r	.208	.199	.550(*)	.564(*)	.499(*)	1	.586(*)
	Sig. †	.516	.536	.018	.015	.035		.011
	N	12	12	18	18	18	18	18
M. Ex.	r	-.283	.088	.336	.255	.218	.586(*)	1
	Sig. †	.373	.786	.173	.307	.385	.011	
	N	12	12	18	18	18	18	18

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Sig. † = Significance (2-tailed)
r = Pearson Correlation Coefficient

CS = cognitive subscale (Early Screening Profile)
LS = language subscale (Early Screening Profile)
RAIM = Reading - Academic Intrinsic Motivation (measured with Y-CAIMI)
MAIM = Math – Academic Intrinsic Motivation (measured with Y-CAIMI)
GAIM = General – Academic Intrinsic Motivation (measured with Y-CAIMI)
R.Ex. = Reading Exposure (measured with HEQ)
M.Ex = Math Exposure (measured with HEQ)

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Appendix

Child-Reported Home Reading and Math Exposure Questionnaire

Directions: Administer after the YCAMI. Record the identification information for the child on all pages of this inventory. Read all directions and items aloud to the child. After each item, ask the child if it is "VERY TRUE/A LITTLE TRUE/NOT TRUE", to complete the sentence with "NONE/SOME/A LOT", or to indicate "ONCE IN A WHILE/SOMETIMES/EVERYDAY", and record the answer on this answer sheet. Lay the cards out in front of the child which indicate VERY TRUE/A LITTLE TRUE/NOT TRUE or NONE/SOME/A LOT. The child may point to a card to indicate his/her answer, or may answer verbally.

Say to the child:

These questions are about your everyday life. Think about your day when you answer.

Each question can have a different answer. For some questions, you need to think about whether it is VERY TRUE for you, A LITTLE TRUE for you, or NOT TRUE for you. Then tell me whether your answer is VERY TRUE, A LITTLE TRUE, or NOT TRUE. For other questions, you will need to finish the sentence with the word NONE, SOME or A LOT. Then tell me whether your answer is NONE, SOME, or A LOT. There are no right or wrong answers to any of the questions, and this is not a test. I will not tell anybody your answers.

Here is an example:
Finish this sentence with NONE/SOME/A LOT: During the day, I play…
NONE SOME A LOT

If you have any questions, or you don't understand something, please let me know.

Note:

Ask child: **Who do you live with?**

If neither parent is included, alter questions about parents to ask about the child's caretaker.

Child-Reported Home Reading and Math Exposure Questionnaire
Section 1: Parent Influence

1R. Finish this sentence with NONE/SOME/A LOT: I see my parents read…
NONE SOME A LOT

2R. Finish this sentence with NONE/SOME/A LOT: My parents read with me…
NONE SOME A LOT

3R. My parents want me to read well.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

4R. Seeing my parents read makes me want to learn about reading.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

5R. My parents like to read.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

6M. Finish this sentence with NONE/SOME/A LOT: I see my parents doing math…
NONE SOME A LOT

7M. Finish this sentence with NONE/SOME/A LOT: My parents do math with me…
NONE SOME A LOT

8M. My parents want me to do math well.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

9M. Seeing my parents do math makes me want to learn about math:
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

10M. My parents like doing math.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

Child-Reported Home Reading and Math Exposure Questionnaire
Section 2: Television

Say to the child: **Please answer these questions as well as you can.**

11. Do you watch TV when you wake up in the morning? YES NO
Do you do this ONCE IN A WHILE SOMETIMES or EVERYDAY

12. Do you watch TV during the day? YES NO
Do you do this ONCE IN A WHILE SOMETIMES or EVERYDAY

13. Do you watch TV when you come home from school? YES NO
Do you do this ONCE IN A WHILE SOMETIMES or EVERYDAY

14. Do you watch TV after dinner? YES NO
Do you do this ONCE IN A WHILE SOMETIMES or EVERYDAY

15. a) What shows do you watch?

b) Which are your favorite shows? [asterisk (*) favorite shows]
c) Which shows do you watch a lot and which ones do you watch only a little bit? [circle most watched shows]

16. Do you watch any of these shows? [If yes, underline the show and then indicate "**a lot**" v. "**a little**" by circling shows watched "a lot".]

321 Contact Barney and Friends Batman Dexter's Laboratory
Duck Tales The Letter People Mister Rogers' Neighborhood
Pinky and The Brain Pokemon The Powerpuff Girls
Reading Rainbow Sesame Street School House Rock
Square One Superman Tom and Jerry Zoom
Where in the USA is Carmen Sandiego/Where in the World is Carmen Sandiego

17R. Finish this sentence with NONE/SOME/A LOT. I see people reading on TV…
NONE SOME A LOT

18R. Seeing people reading on TV makes me want to learn more about reading.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

19M. Finish this sentence with NONE/SOME/A LOT: I see people doing math on TV… NONE SOME A LOT

20M. Seeing people doing math on TV makes me want to learn more about math.
Is this VERY TRUE A LITTLE TRUE or NOT TRUE?

Child-Reported Home Reading and Math Exposure Questionnaire
Section 3: Other people

Say to the child: **These are YES or NO questions. Please answer YES or NO.**

21. Do you spend time with grown-ups other than your parents? **YES NO**

Who?

22R. Do you see any of these grown-ups reading? **YES NO**

23R. Do any of these grown ups like to read? **YES NO**

24M. Do you see any of these grown-ups doing math? **YES NO**

25M. Do any of these grown ups like doing math? **YES NO**