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THINKING SKILLS, ACADEMIC INTRINSIC MOTIVATION, ACADEMIC SELF-CONCEPT, AND ACADEMIC INDEPENDENCE IN HOMESCHOOLED CHILDREN

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Abstract

The purpose of this study was to examine thinking skills, academic intrinsic motivation, academic self-concept, and academic independence in homeschooled children. Homeschooled children ages 6-12 years old (*N*=46) completed the Test of Problem Solving 3: Elementary (TOPS), which measured the following thinking skills: making inferences, sequencing, answering negative questions, problem solving, predicting, and determining causes. The Homeschool Motivation Scale measured academic intrinsic motivation, academic self-concept, and academic independence. Parents completed a brief questionnaire. The results showed that homeschooled children's TOPS scores were significantly higher than those of the test standardization sample for all six subscales and for the total test. There were significant positive correlations between TOPS total test scores and both academic intrinsic motivation and academic self-concept scores. TOPS total test scores were not consistently related to parental teaching techniques. This research suggests that thinking skills may be more advanced in homeschooled children than in children attending public schools.

Keywords: thinking skills, academic intrinsic motivation, homeschooled children

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The Common Core State Standards—educational goals in language arts and math for children at each grade level in U. S. public schools—have currently been adopted by 41 states, the District of Columbia, and four territories. These standards are designed to develop "the critical-thinking, problem-solving, and analytical skills students will need to be successful" in "a world in which colleges and businesses are demanding more than ever before" ("What parents should know," n.d., para. 1, 2). Educators agree that teaching children to think is "just as important as teaching anything else" (Ellerton, 2015, title). Not surprisingly, there is less agreement about whether thinking skills are actually being taught intentionally and effectively in American schools (Kettler, 2014; Paul, Elder, & Bartell, 1997; Thomas, 1999).

Opinions concerning homeschooling are perhaps even more divided. Critics argue that only conventional schools can offer the kind of systematic learning experiences and diverse social contacts that are essential for the development of proficient thinking skills (e.g., Reich, 2002). Homeschooling advocates, however, assert that the regimented environment and standardized curriculum of conventional schools can hinder children's intellectual development by stifling creativity, curiosity, and self-determination (e.g., Gatto, 2010; Holt & Farenga, 2003).

Thinking Skills in Children

In 1956, one of the most influential books in the history of modern education was published. Edited by educational psychologist Benjamin S. Bloom, the goal of the work was to classify educational goals in the cognitive domain (Bloom, 1956). Bloom's original taxonomy included six levels of thought: knowledge, comprehension, application, analysis, synthesis, and evaluation. The taxonomy was later revised so that each level was represented by a cognitive process: remember, understand, apply, analyze, create, and evaluate (Anderson & Krathwohl, 2000). The levels were said to fall along "a continuum from simple to complex and concrete to

abstract" (Armstrong, n.d., para. 4) with remembering, understanding, and applying representing more basic thinking skills and analyzing, creating, and evaluating representing higher levels of thinking (Forehand, 2005).

Bloom's taxonomy was credited with transforming education by encouraging teachers to emphasize higher-order reasoning (Forehand, 2005). More recently, however, the focus has shifted to "critical" thinking. In a general sense, critical thinking refers to "the objective analysis and evaluation of an issue in order to form a judgment" (Oxford Dictionaries Online, 2017). Unfortunately, beyond this basic definition, critical thinking is conceptualized in different ways by different people (e.g., "Defining Critical Thinking," n.d.). Some focus on the analytical process while others focus on how judgments are formed. Some emphasize particular skills while others emphasize general dispositions. Some argue that critical thinking is necessarily tied to specific content areas while others say it transfers easily from one kind of task to another (Abrami et al., 2015). Despite this disunity, however, there is agreement that critical thinking, like Bloom's higher-order thinking, depends on more basic thinking skills and that these skills can be taught to children (Abrami et al., 2015; Forehand, 2005).

Many different strategies have been put forward as ways to teach children the skills that underlie advanced thinking and problem-solving. The list includes encouraging children to answer open-ended questions ("How to Teach Critical Thinking," n.d., para. 2), discuss issues in small groups (Reisinmy, 1991; Tillman, 1994), test hypotheses and evaluate arguments (Zohar, Weinberger, & Tamir, 1994), write journals (Collier, Guenther, & Verrman, 2002), solve problems that have multiple solutions (Lampert, 2006), work together with older children (Murphy, Rowe, Ramani, & Silverman, 2014), engage in role-playing (Abrami et al., 2015), and many more (see "Critical Thinking: Where to Begin," n.d.). Tutoring children individually

(Abrami et al., 2015), giving them the opportunity to participate in music (Salmon, 2010) and drama (Bailin, 1998), and training them to use advanced technologies (Collier, Guenther, & Veerman, 2002) have also been suggested. Teachers have been advised to model curiosity and open-mindedness (Nicoll, 1996), to make their own thinking visible to students and create a "culture of thinking" in the classroom (Salmon, 2008, p. 457), and to increase motivation (Resnick, 1987) by rewarding "good" thinking (Klemm, 2011).

Do these strategies work? Many have not yet been adequately tested, but some clearly do. A meta-analysis of more than 340 studies of the effect of instructional interventions on thinking concluded that "a variety of skills (both generic and content specific) and dispositions can develop in students through instruction at all educational levels and across all disciplinary areas using a number of effective strategies" (Abrami et al., 2015, pp. 301-302). The strongest empirical support was found for teacher-led group discussion, one-on-one tutoring, and problem-solving applied to "authentic" problems, that is, real-life problems that "make sense" to students, "engage them, and stimulate them to inquire" (Abrami et al., 2015, p. 290).

There is currently no published research focused on thinking skills in homeschooled children. However, their academic achievement has consistently been found to be quite high (e.g., Williams, 2014) and their intellectual development in terms of Piaget's stages has been reported to be advanced (Quine & Marek, 1988). Also, some practices associated with the development of thinking skills, such as individualized instruction and children of different ages working together, characterize many homeschools. And adults who were homeschooled as children have been found to have characteristics related to the ability to think critically. They are tolerant of others' viewpoints even when they disagree (Ray, 2004), and compared to peers who were not homeschooled, they are higher in openness to experience (White, Moore, & Squires,

2009), a trait characterized by "intellectual curiosity" and a "readiness to re-examine one's own values and those of authority figures" ("NEO Personality Inventory Revised," n.d., para. 5).

Academic Intrinsic Motivation, Self-Concept, and Independence

In their highly influential theory of motivation, Deci and Ryan (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b) proposed that children enjoy activities that fulfill innate needs for competence and self-determination. According to this theory, solving a challenging problem or mastering a difficult task gives children a satisfying sense of accomplishment and independence. Because the motivation for such activities is intrinsic, external reinforcement is unnecessary. Furthermore, anything that increases children's self-determination also strengthens intrinsic motivation. Conversely, anything that decreases self-determination, including promises of rewards, threats of punishment, public evaluation of performance, and high levels of competition, can undermine children's intrinsic interest in an activity (Deci, Koestner, & Ryan, 1999).

Similarly, academic intrinsic motivation (AIM) refers to learning for its own sake rather than to earn external rewards like grades or recognition. AIM has been found to be positively associated with both academic achievement and academic self-concept (Gottfried, 1985). Parents who give rewards for their children's academic performance can decrease both AIM and achievement, while encouragement of children's curiosity, persistence, and enjoyment of leaning can increase both (Gottfried, Fleming, & Gottfried, 1994). The home environment is also important. A longitudinal study that followed children from 8 to 13 years old led to the conclusion that "children whose home had a greater emphasis on learning opportunities and activities were more academically intrinsically motivated" (Gottfried, Fleming, & Gottfried, 1998, p. 1448).

It has been suggested that conditions supporting AIM may often be a part of many homeschools: making ordinary family activities occasions for learning, not giving grades or rewards for schoolwork, allowing children freedom of choice in some of their studies, and encouraging independent learning (Medlin & Blackmer, 2000; Riley, 2016). There have been, however, few studies of AIM in homeschooled children. Apostoleros (1999) reported that AIM increased with age in homeschooled children and with the number of years they had been homeschooled and that parents' support for children's autonomy was positively related to AIM. Medlin and Blackmer (2000) found that homeschooled children were more intrinsically motivated in reading and less intrinsically motivated in math than children attending a conventional school that used grades to evaluate students' performance. There were no statistically significant differences in AIM between homeschooled children and children attending a school that used portfolio assessment instead of grades. (A portfolio is an organized collection of samples of a student's work.) The amount of time parents spent in direct instruction was positively related to homeschooled children's intrinsic motivation in both reading and math. Liberto's (2016) research suggested that "child-led, interest inspired" learning (para. 1) was especially beneficial for homeschooled children with specific learning disabilities.

Academic self-concept refers to children's perception of their own intellectual and scholastic ability. Two studies have compared homeschooled children's scores on the Intellectual and School Status subscale the Piers-Harris Children's Self-Concept Scale to the test norms, which are derived from a sample of public-school children (Kelley, 1991; Medlin, 1994). Homeschooled children's scores were well above average in both (at the 68th and 72nd percentiles). Kitchen (1991) tested both homeschooled children and children attending

conventional schools with the Self-Esteem Index and found statistically significantly higher scores for the homeschooled group on the Academic Competence subscale.

In the context of homeschooling, academic independence refers to children's ability to learn on their own, apart from direct instruction from their parents. This characteristic has not yet been examined in homeschooled children, but Riley (2015) found that young adults who had been homeschooled were more satisfied with their autonomy generally (not specifically related to learning) than peers who had attended conventional schools. Bolle-Brummond and Wessel (2012) reported that a small group of college students who had been homeschooled "credited their educational background with preparing them to be self-motivated and organized learners" with "the ability to figure things out on their own" (p. 234). And some homeschooling parents cited the opportunity to give their children control over their own learning as one of the reasons they chose to homeschool (English, 2013).

The Present Research

The purpose of this study was to examine thinking skills, AIM, academic self-concept, and academic independence in homeschooled children. It was hypothesized that homeschooled children's scores on a test of thinking skills would be above average when compared to norms derived from a sample of children attending public schools. It was also expected that thinking skills would be positively correlated with AIM, academic self-concept, and academic independence. Finally, it was hypothesized that children's thinking skills, AIM, academic self-concept, and academic independence would be related to parents' teaching practices. For example, asking open-ended questions, making connections between what children are studying and real-life experiences, and using discussion and debate to help children understand an issue were expected to be associated with higher thinking-skills scores. Less structure, not giving

grades or rewards for schoolwork, and allowing children to pursue their own interests and direct their own studies were expected to be associated with higher AIM, academic self-concept, and academic independence scores.

Method

Participants

Homeschooled children ages 6-12 years old (*N*=46) and their mothers (*N*=27) participated in this study. The average age of the children was 8.87 years (*SD*=2.03). The number of boys and girls at each age level is presented in Table 1. The average age of the mothers was 39.70 years (*SD*=5.59). Most (85%) of the children were identified by their mothers as Caucasian, followed by those identified as Hispanic (6.5%), biracial (6.5%), and Asian (2%). Mothers also predominantly identified themselves as Caucasian (89%). In order to be eligible to participate, children had to have been homeschooled for at least one full academic year. As a group, the children had been homeschooled for an average of 3.61 years (*SD*=1.95) and had attended conventional schools for an average of .94 years (SD=1.56). Most (63%) had never attended a conventional school. The sample included children (22%) who were described by their mothers as having special learning needs such as Autistic Spectrum Disorder, Attention Deficit Hyperactivity Disorder, and Specific Learning Disorder. Participants were recruited by convenience sampling through social media and a local homeschool organization. (Convenience sampling is "the most common form of non-probability sampling, where the sample is selected because it is convenient or readily accessible to the researcher") (Elliot, Fairweather, Olsen, & Pampaka, 2016). Information about the study was announced at meetings of a local homeschool organization and posted to three Facebook groups for homeschoolers in the Central Florida

region. Interested parents could schedule appointments online. Whether this sample was representative of the population of homeschooled children in the area was not known.

Materials

Children completed the Test of Problem Solving 3: Elementary (TOPS) (Bowers, Huisingh, & LoGiudice, 2005), which measures thinking skills in children 6-12 years old. The TOPS consists of 96 items based on 18 photographs. The examiner asks the child a series of questions about each photograph. For example, for a picture of a boy lying down and looking ill while his father feels his forehead, the child is asked, "How do you know this boy is sick?" The child's answer to each question is scored on a three-point scale based on relevancy and quality of the response: 0 (unacceptable response), 1 (partial-credit response), or 2 (full-credit response). For the photograph described above, "His eyes are closed," would be a no-credit response while "Because his father is feeling his forehead to see if he has a fever," would be a full-credit response. To make the test appropriate for homeschooled children, questions that included terms related to conventional schools were reworded. For example, "teacher" was changed to "parent," "students" was changed to "children," and "homework" was changed to "schoolwork."

The test includes six subscales, each measuring a different thinking skill: making inferences, sequencing, negative questions, problem solving, predicting, and determining causes. Making inferences "requires the subject to give a logical explanation about a situation, combining what he knows or can see with previous experiences and background information." Sequencing "requires the subject to determine and explain logical, everyday sequences of events, such as what one needs to know or do before taking action in a situation or what one should do first in a given situation." Negative questions ask "why something would not occur or why one shouldn't take a particular action in a specific situation." Problem solving "involves recognizing

a problem, thinking of alternative solutions, evaluating these options, and stating an appropriate solution for a given situation. It also includes stating how to avoid specific problems." Predicting "requires the subject to grasp a presented situation and make a likely prediction about what will happen or what would happen if a certain action were taken in that situation." Finally, determining causes "requires the subject to give a logical reason for some aspect of a situation presented in the photographs" (Bowers, Huisingh, & LoGiudice, 2005, pp. 11-12).

Scores on the six subscales are summed to yield a total score. Raw scores can be converted to age equivalency, percentile rank, and standard scores with a mean of 100 and a standard deviation of 15. The standardization sample for the TOPS was a nationwide, representative group of more than 1,400 children attending public schools. This sample included students from both regular education classes as well as special education classes. According to the TOPS authors, test-retest reliability coefficients range from .62 for the predicting task to .79 for the making inferences and sequencing tasks and .84 for total scores (cf. Skarakis-Doyle, 1991). Reliability coefficients based on item homogeneity range from .52 for the predicting task to .69 for the sequencing and problem-solving tasks. Average interrater reliability is reported to be .89. The test's ability to distinguish between typically developing children and children with language disorder is cited as evidence of concurrent validity (Bowers, Huisingh, & LoGiudice, 2005; cf. Bernhardt, 1990).

The Homeschool Motivation Scale (HMS) was developed by the researchers for use in this study. Existing tests such as the Children's Academic Intrinsic Motivation Inventory (Gottfried, 1986) and the Scale of Extrinsic versus Intrinsic Orientation in the Classroom (Harter, 1981) are designed for children attending conventional schools, and many of the items are not appropriate for children being homeschooled. The scale used here was constructed with

homeschooled children in mind and was designed to measure not only AIM but also academic self-concept and independence from the parents in learning. Each HMS subscale is comprised of ten items (five worded positively and five worded negatively) for a total of 30 items. Sample items include "I like to learn new things" (intrinsic motivation), "I learn things faster than other kids my age" (self-concept), and "I learn things best by myself" (independence). Older children respond to each item by circling either *true, not sure,* or *false*. Younger children respond by circling a smiley face for *true*, a sad face for *false*, or a neutral face for *not sure*. *True* responses count 3 points, *not sure* 2 points, and *false* 1 point, with negatively worded items reverse-scored. Scores on each subscale can range from 10 to 30 with higher scores indicating higher levels of AIM, academic self-concept, and independence from parents.

In a brief questionnaire, parents reported demographic information and the highest level of education they had attained. They rated the degree of structure in their homeschools, which was defined as having a set schedule, preplanned lessons, and a systematic curriculum, on a scale from 1 (*very low*) to 10 (*very high*). They indicated how many hours in a typical day their children spent doing schoolwork and how much time their children were engaged in different learning activities, such as working independently and receiving direct instruction from a parent. Using a rating scale ranging from 1 (*not at all*) to 5 (*very often*), they rated how frequently they used various teaching practices, including those thought to foster thinking skills (e.g., "How often do you use discussion/debate to help your child understand an issue?") and intrinsic academic motivation (e.g., "How often do you give rewards for schoolwork?").

Procedure

Written informed consent was obtained from parents and oral assent was obtained from children before testing began. While parents were completing the questionnaire, children were

administered the HMS and the TOPS. Testing took about 45 minutes for each child. After participating, children could choose a gift from a box of toys, games, and art materials. Their TOPS scores were later emailed to their parents along with a description of the thinking skills measured and an explanation of how to interpret the scores. At the conclusion of the study, parents received a summary of the results.

Results

TOPS

All calculations involving TOPS scores used standard scores because they are independent of the child's age, allowing children of different ages to be compared to one another directly. Mean TOPS scores with corresponding percentile ranks are presented in Table 2. Note that all percentile ranks are above the 50th percentile, which is the average for children attending public schools (Bowers, Huisingh, & LoGiudice, 2005). Independent-samples *t*-tests were computed to compare homeschooled children's mean TOPS scores to those of the standardization sample. (Because the variances were unequal, Welch's *t* was used.) Homeschooled children's scores were statistically significantly higher than those of the standardization sample for all six subscales and for the total test (see Table 3).

Homeschooled girls' mean score on the TOPS negative questions subscale (M=108.70, SD=8.59) was statistically significantly higher than that of homeschooled boys (M=102.26, SD=9.04), $t(44)$=-2.48 (p=.017). Boys and girls did not differ on the other subscales. However, the girls' mean total test score (M=107.00, SD=7.71) was also statistically significantly higher than that of the boys (M=102.39, SD=7.30), $t(44)$=-2.08 (p=.043).

HMS

Cronbach's alpha was used to assess the internal consistency of the HMS. Although the reliability of the test as a whole was respectable (α=.783), the reliability of each of the subscales—AIM (α=.614), academic self-concept (α=.649), and academic independence (α=.641)—was marginal (DeVellis, 1991). Mean HMS scores are presented in Table 4. A series of *t*-tests showed that boys' and girls' mean HMS subscale scores were not statistically significantly different. Academic self-concept scores and academic independence scores were positively correlated with children's age: $r(45)$=.336 (p=.022) and $r(45)$=.381 (p=.009) respectively. AIM scores were correlated with TOPS total test scores, $r(45)$=.371 (p=.011). There were also statistically significant correlations between academic self-concept scores and TOPS making inferences, problem-solving, and total test scores: $r(45)$=.295 (p=.047), $r(45)$=.322 (p=.029), $r(45)$=.393 (p=.007) respectively.

Parent Questionnaire

Of the 27 mothers in the study, most (14) had a college degree while 2 had earned only a high school diploma, 7 had an associate degree, and 4 had a master's, doctoral, or professional degree. A series of *t*-tests comparing TOPS and HMS scores of children whose mothers had earned a high school diploma or associate degree to those whose mothers had a college, graduate, or professional degree yielded no statistically significant results.

Mothers' mean rating of the amount of structure in their homeschools was 6.48 (SD=2.01). The degree of structure was not statistically significantly correlated with any TOPS or HMS scores. Mothers reported that their children spent a little over four hours a day doing schoolwork, with their time split fairly evenly between working independently and receiving direct instruction from parents. They worked together with other children and received

instruction outside the home for about an hour each in a typical day. Online instruction was the least likely alternative—only 20 minutes per day on average.

Mean ratings of how often mothers used different teaching practices are presented in Table 5. The teaching techniques mothers reported using most often were helping their children make connections between what they were learning and "real life" and asking their children open-ended questions. They were also likely to use hands-on learning activities, read aloud to their children, use discussion and debate to help their children understand an issue, and allow children to pursue their own interests. They were not likely to give their children grades or rewards for schoolwork.

There were only two statistically significant correlations between teaching practices and TOPS subscale scores. Reading aloud was positively correlated with predicting scores, $r(45)=.361$ ($p=.014$), and asking open-ended questions was negatively correlated with negative questions scores, $r(45)=-.302$ ($p=.042$). No teaching techniques were statistically significantly correlated with TOPS total scores or with AIM scores. Giving rewards and reading aloud were both negatively correlated with academic self-concept scores: $r(45)=-.320$ ($p=.030$) and $r(45)=-.358$ ($p=.015$) respectively. Allowing children to direct their own studies was positively correlated with academic self-concept, $r(45)=.415$ ($p=.004$), and independence from parents, $r(45)=.377$ ($p=.010$).

Discussion

The hypothesis that homeschooled children's scores on a test of thinking skills would be above average when compared to norms derived from a sample of children attending public schools was supported. Homeschooled children's scores were well above the average for public-school children, ranging from the 58th to the 67th percentile. Girls had higher scores overall than

boys, perhaps because test performance depends heavily on language ability (Burman, Bitan, & Booth, 2008). The hypothesis that thinking-skills scores would be positively correlated with measures of AIM and academic self-concept was also supported. However, thinking-skills scores were not associated with academic independence. Academic self-concept and academic independence both increased with age.

Although the mothers in this study frequently used strategies that previous research has associated with the development of thinking skills and intrinsic motivation, their teaching practices were not significantly correlated with children's TOPS total scores or AIM scores. Many parents choose to homeschool because it allows them to "customize or individualize the curriculum and learning environment for each child" (Ray, 2018, para. 9). If the parents in this study were matching their teaching techniques to each child's individual needs, then trying to identify the strategies that worked best for the group as a whole may have been misguided. However, as expected, giving rewards for schoolwork was negatively related to academic self-concept, and allowing children to direct their own studies was positively related to academic self-concept and academic independence. It is possible that parents of children who struggle with their schoolwork find that external rewards help motivate their children, and that parents of more confident, self-reliant students allow them greater freedom of choice in their schoolwork. It is also possible, as previous research suggests (e.g., Gottfried, Fleming, & Gottfried, 1994), that increasing children's self-determination by avoiding external pressures and enabling self-directed studies improves both academic self-concept and academic independence.

Limitations

The TOPS standardization sample was more diverse (59% Caucasian) than the sample of homeschooled children in this study (85% Caucasian). However, in 42 analyses, the test

developers found only five very specific statistically significant effects of race/ethnicity on TOPS scores—for example, among nine-year-olds, Hispanic children scored lower than Caucasian and African-American children on the determining causes subscale (Bowers, Huisingh, & LoGiudice, 2005). It should not be assumed, therefore, that children's racial/ethnic background would have a marked effect overall. Also, the homeschooling mothers in this study were twice as likely as the general population of adults in the U. S. to hold a bachelor's degree or higher (United States Census Bureau, 2017). To what extent mothers' education may have influenced children's scores is unknown and would seem to be a relevant question for future research to address. Finally, the proportion of children in this study with special learning needs (22%) exceeded that of children in U. S. public schools receiving special education services (13%), which may have depressed scores in the homeschooled group relative to the standardization sample (National Center for Education Statistics, 2017).

Conclusion

This research suggests that thinking skills may be more advanced in homeschooled children than in children attending public schools. Since most of the children in this study were exclusively homeschooled, it is reasonable to assume that the homeschool learning environment is more than sufficient to teach children the intellectual skills that form the building blocks of higher-order thinking. What is not clear is exactly how this happens, since the parental teaching techniques that were measured here were not strongly linked to children's test scores. It may be that the homeschool environment, the quality of the parent-child relationship, and more global aspects of the teaching-learning experience have more influence than specific teaching techniques (Mayberry, 1993). Homeschooling also apparently supports the development of academic self-esteem and academic independence, as both increased with age in this group.

Future research would do well to directly compare matched groups of public-schooled and homeschooled children and to examine further how homeschooling parents help their children learn the basic thinking skills that eventually lead to more advanced reasoning.

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Table 1

The Number of Boys and Girls at Each Age Level

Age in Years	Boys	Girls	Total
6	4	4	8
7	2	4	6
8	4	3	7
9	4	2	6
10	1	5	6
11	4	4	8
12	4	1	5
Total	23	23	46

Table 2

Mean TOPS Standard Scores with Corresponding Percentile Ranks

TOPS Subscale	*M*	*SD*	Percentile Rank
Making Inferences	106.50	9.94	67
Sequencing	106.41	9.33	67
Negative Questions	105.48	9.31	64
Problem Solving	103.37	8.47	59
Predicting	103.02	7.51	58
Determining Causes	106.35	11.52	66
Total Test	104.70	7.78	62

Table 3

Independent-Samples t-Tests Comparing Homeschooled Children's Mean TOPS Scores to Those of the Standardization Sample

TOPS Subscale	*t*	*df*	*p*
Making Inferences	-4.28	51	<.001
Sequencing	-4.47	52	<.001
Negative Questions	-3.83	52	<.001
Problem Solving	-2.57	54	.013
Predicting	-2.57	57	.013
Determining Causes	-3.64	50	<.001
Total Test	-3.87	56	<.001

Table 4

Mean HMS Subscale Scores

HMS Subscale	*M*	*SD*
Intrinsic Academic Motivation	21.50	3.30
Academic Self-Concept	22.48	3.81
Independence from Parents	20.30	3.85

Table 5

Mean Ratings of How Often Parents Use Various Teaching Practices

Teaching Practice	*M*	*SD*
Give grades for schoolwork	2.26	1.45
Give rewards for schoolwork	2.76	1.21
Allow your child to pursue his/her own interests	4.07	.77
Read aloud to your child	4.17	.93
Wait and let your child figure things out rather than helping	3.85	.89
Ask open-ended questions	4.33	.63
Have your child make connections between what he/she is learning and real-life situations	4.50	.69
Have your child identify patterns in what they are studying	3.96	.87
Use hands-on learning activities	4.17	.83
Use discussion/debate to help your child understand an issue	4.15	.84
Allow your child to direct his/her own work	3.24	1.23