

PAULETTE E. MILLS, Washington State University, Pullman; KEVIN N. COLE, Washington Research Institute, Seattle; JOSEPH R. JENKINS, University of Washington, Seattle; and PHILIP S. DALE, University of Missouri, Columbia

# *Early Exposure to Direct Instruction and Subsequent Juvenile Delinquency: A Prospective Examination*

**Abstract:** In a widely cited follow-up study of disadvantaged preschool attendees, Schweinhart, Weikart, and Lerner (1986a) found that graduates of an early childhood program using Direct Instruction (DI) methods exhibited higher rates of juvenile delinquency at age 15 than did graduates of 2 other preschool education models. The present research examined juvenile delinquency outcomes for young children with disabilities in a prospective longitudinal study that tracked the long-term impact of 2 preschool models—1 using DI, the other using a cognitively oriented, child-directed model. We followed 171 children who had been randomly assigned to the 2 early childhood models. At age 15, the groups did not differ significantly in their level of reported delinquency. Analyses suggest that gender differences in delinquent behavior may provide a more parsimonious explanation than program effects for the earlier Schweinhart et al. findings.

The value and long-term impact of early intervention have been examined extensively over the past 2 decades. Core questions have

included whether early intervention increases children's skills (e.g., Casto, 1988; Guralnick, 1988, 1998), whether early intervention models derived from differing theoretical bases have different effects (e.g., Cole, Dale, Mills, & Jenkins, 1993; Yoder, Kaiser, & Alpert, 1991), and whether the effects of early intervention last beyond the early years (Mills, Dale, Cole, & Jenkins, 1995; Schweinhart et al., 1986b). Most studies in these areas focus on cognitive, language, and academic outcomes, but a growing appreciation of the interdependence of cognitive, academic, and social development has prompted researchers to broaden the question of early intervention effects to include social development outcomes (e.g., Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Davis, Brady, Hamilton, McEvoy, & Williams, 1994; Odom et al., 1999).

The hypothesis that early childhood programs produce differential effects on social skills and behavior is a plausible one. For example, child-directed, cognitively oriented programs often include a metacognitive component designed to increase self-awareness, self-monitoring,

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This research was supported by Grant H324C990012 from the U.S. Department of Education to the University of Washington. Address correspondence to Joseph R. Jenkins, University of Washington, Experimental Education Unit, Box 357925, Seattle, WA 98195-7925.  
Email: jjenkins@u.washington.edu.

and self-regulation that may improve an individual's ability to control impulsive and antisocial behaviors (Krogh, 1997; Smith, 1997). Alternatively, academically oriented programs may advantage children on academic tasks, increasing children's self-esteem and lessening academic frustration and stress linked to problem behaviors (Calhoun & Beattie, 1987; Lawrence, 1988).

In one of the most striking and provocative studies on the long-term impact of early childhood education, Schweinhart et al. (1986b) found evidence for a relationship between a specific early childhood educational approach and later juvenile delinquency. These researchers followed children from three early childhood education programs, each with a different emphasis. They included High/Scope (Hohmann, Banet, & Weikart, 1979), an "open-framework approach, in which teacher and child both plan and initiate activities and actively work together" with the intention "to promote intellectual and social development" (Schweinhart et al., 1986b, p. 18); DI (Bereiter & Engelmann, 1966), an academically oriented program in which teachers use scripted lessons to teach reading, math, and language skills; and DARCEE (National Education Association, 1977), a traditional nursery school program employing a "child-centered approach, in which the child initiates and the teacher responds" and where "the teacher encourages children to actively engage in free play" in a broadly enriched environment of toys, materials, and play activities (Schweinhart et al., 1986b, p. 18).

At age 15, graduates of the three programs responded to a questionnaire on antisocial behavior (see Figure 1). Graduates of the DI preschool reported more antisocial behavior than graduates of the other preschool programs. Schweinhart et al. (1986b) speculated that the relative emphasis on teacher-directed academic learning in the DI approach sacrificed opportunities for the kind of child-directed experiences necessary for

learning self-regulatory, prosocial skills. The provocative nature of the finding attracted considerable attention and led to a debate about early childhood education among Schweinhart, Weikart, and Lerner (1986a) and proponents of DI (i.e., Bereiter, 1986a, 1986b, Gersten, 1986).

Schweinhart et al. (1986b) acknowledged a need for replication studies, but despite an absence of corroborating findings, the link between DI and juvenile delinquency was widely reported in education journals and in the popular press. Schweinhart et al.'s article has been cited over 600 times (Social Sciences Citation Index), and the findings passed on in thousands of articles reporting the finding as a secondary source. The DI model was characterized in the *New York Times* as an "early education pressure cooker approach" that damages children and leads to violence (Hechinger, 1986). Some researchers accepted the DI-delinquency link at face value and sought to identify causal factors within the model that put graduates on delinquent paths (e.g., DeVries, Haney, & Zan, 1991; DeVries, Reese-Learned, & Morgan, 1991).

The relationship between the DI model of early childhood education and delinquency reported in a single study has thus had considerable influence on practice and thinking in early childhood education (Schweinhart & Weikart, 1998). The implications of their study are especially relevant to the field of special education. Teacher-initiated DI is often considered an appropriate component of a carefully designed program for young children with disabilities (e.g., Sandall, Schwartz, & Joseph, 2001). However, if early exposure to DI actually leads to later higher rates of juvenile delinquency, then use of the model in early intervention should be strongly reconsidered. An examination of the long-term influence of early DI on antisocial behavior is warranted for this population. We report in this article an examination of the long-term social effects of DI and child-directed instruc-

tion for preschoolers. Employing a substantial sample in a fully randomized experimental design, we assigned children who qualified for special education services to one of two preschool models, DI or a cognitively-based, child-directed model called Mediated Learning (ML), then followed program graduates into adolescence.

## Method

This study included both an intervention and a follow-up phase. We provide a relatively brief description of the preschool intervention phase (detailed accounts are available in Cole et al., 1993 and Mills et al., 1995), followed by

a detailed description of the methods for the follow-up of children at age 15.

## Preschool Intervention Phase

*Participants.* Two hundred and six children between the ages 3 and 7 years ( $M = 4.9$ ,  $SD = .96$ ) participated in the intervention phase of the study. According to state administrative code, all children were eligible for special education services based on developmental delays or on medical diagnoses. On entry into the program, their mean IQ on the McCarthy Scales of Children's Abilities (McCarthy, 1972) was 76.7. Approximately 80% of the students had delayed language, 50% cognitive delays, 60% fine motor delays, 60% gross motor

**Figure 1**  
*Questions presented to participants.*

- Have you ever argued or had a fight with either of your parents?
- Have you ever run away from home?
- Have you ever hit an instructor or supervisor?
- Have you ever gotten into a serious fight in school or at work?
- Have you ever taken part in a fight where a group of your friends were against another?
- Have you ever hurt someone badly enough to need bandages or a doctor?
- Have you ever used a knife or gun or some other thing (like a club) to get something from a person?
- Have you ever taken something not belonging to you worth under \$50?
- Have you ever taken something not belonging to you worth over \$50?
- Have you ever taken something from a store without paying for it?
- Have you ever taken a car that didn't belong to someone in your family without permission of the owner?
- Have you ever taken part of a car without permission of the owner?
- Have you ever gone into some house or building when you weren't supposed to be there?
- Have you ever set fire to someone's property on purpose?
- Have you ever damaged school property on purpose?
- Have you ever damaged property at work on purpose?
- Have you ever smoked marijuana?
- Have you ever used any drugs or chemicals to get high or for kicks, except marijuana and alcohol?

delays, and 60% social-emotional delays. Approximately 20% also had a medical diagnosis, such as cerebral palsy, Down syndrome, or seizure disorder. The majority of children exhibited a significant delay in more than one of the five developmental domains.

*Classes and assignment for intervention.* Each year for 4 years, new students were randomly assigned to either DI (Engelmann & Bruner, 1974; Engelmann & Carnine, 1975; Engelmann & Osborn, 1976) or to ML (Osborn & Sherwood, 1984) programs. Children participated in the programs for an average of 1.65 years, range 1 to 4 years. Modal length of participation was 1 academic year.

Children attended classes in a university laboratory school for 2 hr per day, 5 days a week for 180 school days. There were six preschool classes per year, three for each program, with 12 students in each. One of the three classes for each program enrolled 4 typically developing students and 8 children with disabilities; other classes enrolled only students with disabilities. We report data only for those students with disabilities. In addition, some children attended a kindergarten class for 5.5 hr per day, 5 days a week for 180 days. There was one such kindergarten class for each program, with 14 students per class.

Across both programs, classrooms were staffed with a head teacher who held a Master's degree in Special Education and one assistant teacher, as well as additional staff including occupational and physical therapists, speech language pathologists, and student interns, resulting in a student-staff ratio of approximately 4:1.

*Program descriptions.* DI is derived from an extensive task analysis of academic skills, which serves as the basis for a systematic approach for teaching academic skills. It is based on the educational philosophy of Siegfried Engelmann (e.g., Engelmann & Bruner, 1974; Engelmann & Carnine, 1975;

Engelmann & Osborn, 1976) and embodied in curriculum materials published as *DISTAR* math, language, and reading. DI is teacher directed and fast paced, utilizing highly structured presentation of material with frequent opportunities for student response and reinforcement or correction.

By contrast, ML emphasizes the development and generalization of cognitive processes rather than specific academic content. The theoretical ancestry of ML is derived from Vygotsky (1962) and Feuerstein (Feuerstein, Rand, Hoffman, & Miller, 1980). The approach was originally brought to the United States and developed by Haywood, Brooks, and Burns (1986). The preschool curriculum was further developed by Osborn and Sherwood (1984). The curriculum is organized around such processes as comparison, classification, perspective changing, and sequencing. Teachers interpret the environment according to students' needs, responding and modeling, rather than teaching directly. Constructivist in theory and design, ML includes problem-solving activities, with children and teachers working together; multiple opportunities for children to select materials and activities; and encouragement of child initiation of interactions. Instruction focuses on promoting generalization of cognitive processes to new environments. At the preschool level, ML did not include formal instruction in reading, math, and language skills. At the kindergarten level, children received developmentally appropriate activity-based instruction including the Mathematics-Their-Way (Baratta-Lorton, 1974) program and the Addison-Wesley "Superkids" reading program (Rowland, 1982).

As reported in Cole et al. (1993) and Mills et al. (1995), graduates of the two programs did not differ on cognitive, language, or academic measures taken at the end of 1 year of intervention and at follow-up testing at age 9. However, at both time points there were several significant aptitude-by-treatment interac-

tions. Children who performed higher on cognitive and language measures at pretest showed relatively larger gains from DI than ML, whereas children who performed lower on pretests demonstrated relatively larger gains from ML than DI. The magnitude of these interactions remained comparable over time.

Further information about DI and ML, including information on teacher training and fidelity of implementation is provided in Cole et al. (1993) and Notari, Cole, Osborn, and Sherwood (1996).

### Follow-Up Phase at Age 15 Years

*Participants.* We followed children who had completed at least 1 year of early intervention, conducting annual assessments with a battery of tests that varied according to the age of the student. The distribution of the sample by program, ethnicity, gender, and preschool entry

IQ and language performance is presented in Table 1. By age 15 the follow-up sample included 171 students, or 83% of the original sample (77% of DI group and 89% of ML). This included 119 males, 62% European American; 29% African American; and 9% Pacific Islander, Asian, Latino, or Native American. Chi square analyses indicated the follow-up DI and ML groups did not differ significantly on gender or ethnicity ( $p > .05$ ).

#### *Juvenile delinquency self-report questionnaire.*

When graduates reached age 15, they responded to Schweinhart et al.'s (1986b) juvenile delinquency questionnaire. The questions are presented in Figure 1. Items seek information on the frequency of behaviors such as fighting, running away from home, stealing, weapons use, arson, and drug use. Consistent with Schweinhart et al., we scored each item 0 for *not at all*, 1 point for

**Table 1**  
*Descriptive Statistics for Follow-Up Phase Participants*

	<i>Program</i>			
	<i>Direct Instruction</i>	<i>Mediated Learning</i>		
Characteristics				
	<i>n</i>	<i>n</i>		
Gender				
Male	56	63		
Female	25	27		
Ethnicity				
European American	43	63		
African American	29	21		
Other	9	6		
Standardized Measures at Entry Into Preschool				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
McCarthy Cognitive Index	77.82	17.50	76.08	15.91
Peabody Picture Vocabulary Test	78.52	17.36	80.67	16.31

once, 2 points for *twice*, 3 points for *three or four times*, or 4 points for *five or more times*.

*Procedures.* To assure students' anonymity, neither their names nor other identifying information were linked to their answers. Testers coded only information about students' preschool program assignment, gender, ethnicity, and current living arrangement (i.e., living with a single parent, both parents, or residential placement) on individual response forms. With our relatively large sample size, this set of variables was intentionally insufficient to identify individual participants, thus protecting participants' anonymity. Participants were assured their answers would remain confidential even from testers and could not be tied to them personally. Participants who could not read the questionnaire received assistance from a tester and were assured that no information would be revealed. After completing the paper and pencil questionnaire privately in the testing room, students inserted the interview form into an envelope, which they sealed and placed in a locked box which remained unopened until all testing for that year was completed. Although this procedure prevented analyses relating questionnaire responses to cognitive or academic test scores, it increased the probability that youth would respond truthfully, without fear of social, civil, or criminal recourse.

## Results

First, we examined the proportion of respondents from the two programs who left one or more questions unanswered. Rate of incomplete responding was similar for the two groups: DI (4%) and ML (6%). We were also able to determine the number of students who completed the assessment battery (which included several other measures), but declined to answer the delinquency questionnaire. Three DI graduates declined to answer the questionnaire, whereas all ML graduates agreed to participate.

Following Schweinhart et al.'s (1986b) approach, we examined program differences for self-report of delinquency at the level of overall questionnaire score (total delinquent acts), subscale scores (personal violence, property damage, stealing, drug abuse, and status offenses), and individual questionnaire items (Table 2). None of the 25 *t*-tests were significant (all  $p > .08$ ). Effect sizes ranged from  $-.27$  to  $.16$ , considered to fall in the "small" range (Cohen, 1988; Sedlmeier & Gigerenzer, 1989). Of the 25 effect sizes computed, 20 were negative, reflecting differences that were opposite the predicted direction of higher juvenile delinquency for DI graduates.

We then conducted two sets of analyses of variance (ANOVAs): one for Program  $\times$  Gender and the other for Program  $\times$  Ethnicity. Uneven and small cell sizes ruled out Program  $\times$  Gender  $\times$  Ethnicity analyses. Our interest in gender effects stemmed from differences in the proportion of males and females between Schweinhart et al.'s (1986b) two groups, which may have affected their findings. We also examined ethnicity and its interaction with program because our sample included proportionally more European Americans than Schweinhart et al.'s. The two sets of analyses were conducted on the total and the subscale scores, but not on individual items.

*Program  $\times$  Gender analysis.* Program effects were not significant either for number of delinquent acts or for subscale scores. (All  $F$ s  $< 1.7$ ,  $df$  in the denominator vary from 159 to 167 depending on the number of students responding to each item.) Table 3 shows that self-report of delinquent acts was similar for DI and ML models.

Gender was significant for total delinquent acts,  $F(1, 159) = 4.88, p = .03$ , and for the subscales measuring personal violence,  $F(1, 166) = 9.37, p = .003$ ; property damage,  $F(1, 164) = 3.80, p = .05$ ; and stealing,  $F(1, 165) = 4.63, p = .03$ , with males reporting higher delinquency levels than females. However, the

Program  $\times$  Gender interaction was not significant for either total delinquent acts or for any subscales (all  $F$ s < 1).

*Program  $\times$  Ethnicity results.* Significant main effects were found for ethnicity on total delinquent acts,  $F(2, 157) = 4.08, p = .02$ , and for

the subscales of personal violence,  $F(2, 164) = 3.69, p = .03$ ; and stealing,  $F(2, 163) = 6.17, p = .003$ , with African-American students reporting more delinquent acts than European-American students and students classified as "Other." The Program  $\times$  Ethnicity interaction was significant for total

**Table 2**  
*Means and Standard Deviations for Delinquent Act Ratings by Curriculum Groups*

<i>Variable</i>	<i>Direct Instruction</i>		<i>Mediated Learning</i>		<i>Effect Size</i>
	<i>(n = 78–81)<sup>a</sup></i>		<i>(n = 89–90)<sup>a</sup></i>		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Total delinquent acts	11.05	13.66	12.62	14.27	-0.11
Personal violence subscale	3.01	4.12	3.66	4.70	-0.15
Hit an instructor/supervisor	0.37	0.90	0.41	0.92	-0.04
Had a serious fight in school or at work	1.01	1.37	1.07	1.40	-0.04
Been in a group fight	0.80	1.21	1.13	1.45	-0.25
Seriously injured someone	0.56	1.07	0.80	1.26	-0.21
Used a weapon to get something <sup>b</sup>	0.27	0.84	0.31	0.98	-0.04
Property damage subscale	0.71	2.10	1.06	1.93	-0.17
Committed arson	0.28	0.98	0.20	0.69	0.10
Purposely damaged school property	0.44	1.08	0.78	1.37	-0.27
Purposely damaged work property	0.02	0.46	0.11	0.57	-0.17
Stealing subscale	3.75	5.42	3.98	5.41	-0.04
Stolen something worth under \$50	1.04	1.52	1.11	1.57	-0.04
Stolen something worth over \$50	0.59	1.24	0.62	1.29	-0.02
Stolen something from a store	1.30	1.53	1.30	1.49	0.00
Stolen a car	0.23	0.81	0.30	0.92	-0.08
Stolen part of a car	0.33	0.97	0.34	1.00	-0.01
Used a weapon to get something <sup>b</sup>	0.27	0.84	0.31	0.98	-0.04
Drug abuse subscale	0.98	2.15	0.90	1.91	0.04
Smoked marijuana	0.57	1.34	0.67	1.40	-0.07
Used other illegal drugs	0.40	1.10	0.24	0.84	0.16
Status offenses subscale	3.32	3.35	3.68	3.30	-0.11
Argued or fought with parents	1.95	1.67	2.10	1.66	-0.09
Run away from home	0.58	1.12	0.51	1.13	0.06
Trespassed	0.79	1.41	1.07	1.57	-0.19

<sup>a</sup>*df* varied according to the number of students responding to a question.

<sup>b</sup>Weapon use was included in both scales in the original version of the questionnaire.

delinquent acts,  $F(2, 157) = 3.15, p = .04$ , and the stealing subscale,  $F(2, 163) = 5.68, p = .004$ . African-American students in DI had significantly lower delinquent acts than did African-American students in ML.

*Relative delinquency levels.* We compared our delinquency levels with those of Schweinhart et al. (1986b; see Table 4). The mean number of delinquent acts reported by DI graduates from the two studies were comparable,  $t(94) = .54, ns$ . However, relative to Schweinhart et

al.'s High/Scope graduates, ML graduates reported significantly more delinquent acts,  $t(105) = 3.70, p < .001$ .

## Discussion

In contrast to Schweinhart et al.'s (1986b) results, the most striking finding of this study is the absence of program effects on *any* aspect of delinquency, even though both studies focused on children of comparable ages,

**Table 3**

*Means and Standard Deviations for Total and Subscale Scores by Gender and Ethnicity*

<i>Delinquent Acts</i>	<i>Direct Instruction</i>				<i>Mediated Learning</i>			
	<i>Male</i>		<i>Female</i>		<i>Male</i>		<i>Female</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total acts	12.51	15.11	7.56	8.61	14.36	14.80	8.89	12.53
Personal violence	3.72	4.60	1.33	1.81	4.29	5.06	2.22	3.41
Property damage	0.95	2.45	0.13	0.34	1.21	1.98	0.71	1.82
Stealing	4.46	6.06	2.08	2.98	4.44	5.51	2.96	5.14
Drug abuse	1.04	2.23	0.83	1.97	1.08	2.01	0.50	1.67
Status offenses	3.42	3.52	3.08	2.93	4.08	3.48	2.78	2.71

  

	<i>Direct Instruction</i>						<i>Mediated Learning</i>					
	<i>European American</i>		<i>African American</i>		<i>Other</i>		<i>European American</i>		<i>African American</i>		<i>Other</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total Acts	11.54	14.62	11.76	14.01	6.00	3.46	9.83	11.65	22.21	18.85	10.17	9.54
Personal Violence	3.09	4.36	3.45	4.27	1.22	1.39	2.82	3.71	6.24	6.53	3.33	3.67
Property Damage	0.80	2.53	0.76	1.72	0.11	0.33	0.89	1.88	1.75	2.15	0.50	1.22
Stealing	3.86	6.05	3.86	4.97	2.75	3.37	2.55	3.78	8.57	7.45	2.67	1.51
Drug Abuse	1.14	2.34	0.86	2.08	0.56	1.33	0.58	1.68	1.74	2.26	1.50	2.34
Status Offenses	3.79	3.73	3.00	3.07	2.11	1.69	3.48	3.14	4.67	3.42	2.33	4.32

employed similar preschool curricula, and used the same measure of delinquency. There are several differences between the two studies, however, that may explain the discrepant results. They include design differences, program characteristics, historical context, and sample differences. Each of these four areas is discussed below.

*Design differences.* In reporting their seminal study, Schweinhart et al. (1986b) acknowledged that small sample size and incomplete random assignment may have affected their results. We attempted to overcome these problems by substantially increasing sample size (i.e., at least 77 children per group, vs. 18 per group in the earlier study) and randomly assigning all of our participants to preschool programs (vs. 87% in the earlier study).

The two studies also differed in degree of anonymity provided respondents. Schweinhart et al. (1986b) employed as data collector a former local high school coach “who knew well the neighborhood where the families of the 15-year-olds in the study lived” (Schweinhart et al., 1986a, p. 304). By contrast we provided subjects complete anonymity and visibly handled their survey responses in a manner to assure them of this fact. Validity of results based on self-report rests in large part on the willingness of youth to respond truthfully, without fear of unfavorable social perception

or of prosecution for their disclosures. The anonymity provided respondents in our study was designed to encourage honest reporting.

*Program characteristics.* Although the DI programs used in the two studies were derived from the same general theoretical model, they varied significantly in form and completeness. We were able to use the commercial version of the *DISTAR* materials, rather than less specific DI guidelines available at the time of the Schweinhart et al. (1986b) study. Authors of *DISTAR* have noted that the nascent DI methods from the earlier study are not a valid representation of their final published *DISTAR* materials (even though they were mistakenly referred to as *DISTAR* in Schweinhart et al., 1986b). Although earlier and later versions of DI may have differed in inducing juvenile delinquency, the mechanism for such an effect is not apparent.

Could differences among the High/Scope, DARCEE, and ML models explain the different results from the two studies? The ML model, like the High/Scope model and DARCEE, is a developmentally appropriate, child-directed, cognitively oriented approach. In ML children were encouraged to plan, make choices, and solve problems independently. ML incorporates the essential elements of an open-framework and child-directed approach in which creative activities and solutions are sup-

**Table 4**  
*Means and Standard Deviations of Total Delinquent Acts Reported in the Two Studies*

	<i>Present Study</i>		<i>Schweinhart et al. (1986b)</i>		<i>t value</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
DI Curricula	11.05	13.66	12.83	12.33	0.54
Cognitive curricula	12.62	14.27	5.44 <sup>a</sup>	5.15 <sup>a</sup>	3.70*

<sup>a</sup>High/Scope.

\* $p < .001$ .

ported, and children are encouraged to select activities in a structured environment. Teachers assume the role of facilitator, rather than director. ML bears greater family resemblance to the High/Scope and DARCEE models than to the highly teacher-directed, academically oriented DI model.

*Historical context.* The overall level of delinquent acts reported by both our DI and ML groups was comparable to that of Schweinhart et al.'s (1986b) DI group. The high overall level of delinquent behaviors in the present study is consistent with the national trends that show a 70% increase from the previous decade (Snyder & Sickmund, 1999). However, the relative difference in the rate of juvenile delinquency between the two time periods cannot account for absence of group differences in the present study.

*Sample differences.* The principal difference between the research samples in the two studies is that our sample qualified for special education services. This distinction is not as marked as it might appear, however, because the average IQ scores were similar for the children in the two studies (approximately 80), and special education services were not federally mandated at the time of the Schweinhart et al. (1986b) study. It is a reasonable conjecture that many of Schweinhart et al.'s children would have qualified for services under today's eligibility guidelines. Our study probably included more children with characteristics such as Down syndrome, cerebral palsy, and other specific diagnoses. However, children with severe disabilities were not included in our study, allowing a sampling of participants more similar to those in the Schweinhart et al. study.

The two studies also differed on sample ethnicity. The majority of children in the 1986 study were African American versus approximately 30% African-American children in our study. This sample difference does not resolve the different findings between the studies. In fact the only significant Program  $\times$  Ethnicity

interactions were due to African-American youth in ML reporting higher scores (relative to DI) for total delinquent acts and the stealing subscale.

The most parsimonious explanation for the different results in the two studies lies in the gender differences between the samples. At follow-up Schweinhart et al.'s (1986b) DI group had 57% more boys than their High/Scope group (11 vs. 7). Similarly, their DI group had 38% fewer girls than did their High/Scope group (8 vs. 11). The balance between males and females in Schweinhart et al.'s treatment groups changed markedly between the intervention phase and the follow-up phase, resulting in substantial difference in males and females between curriculum groups. This is a critical research design problem because males participate in unlawful behavior approximately four times more than females (Office of Juvenile Justice and Delinquency Prevention, 1993). This difference is not a new trend and has been documented in studies specifically addressing the relationship between early education experience and delinquency (e.g., Farnworth, Schweinhart, & Berrueta-Clement, 1985). The higher proportion of adolescent males in the DI sample relative to the High/Scope sample provides a possible explanation for the higher level of reported delinquent acts for the 1986b DI group.

The confound of program with gender in Schweinhart et al.'s (1986b) study provides a rival hypothesis to their interpretation that preschools using child-initiated learning activities reduce the rates of juvenile delinquency, relative to preschools using teacher-directed approaches. The effect of imbalance in number of males and females between the groups provides an explanation based on a widely researched and consistently documented phenomenon: a higher rate of delinquent behavior for males than females (Bjerregaard & Smith, 1993; Broidy & Agnew, 1997; Burton, Cullen, Evans, Alarid, & Dunaway, 1998; Canter, 1982;

Farnworth et al., 1985; Jang & Krohn, 1995; Mears, Ploeger, & Warr, 1998; O'Brien, 1999; Triplett & Jarjoura, 1997). Schweinhart et al.'s apparent program differences may have been the result of gender imbalances in their follow-up groups.

Attributing these differences to gender imbalances rather than program effects reconciles the discrepancy in findings between the Schweinhart et al. (1986b) study and the current study. A gender explanation is also consistent with a large body of research on gender and delinquency, whereas there are no other corroborative findings to indicate that child-directed preschool curricula serve as a protective factor against later delinquency.

### *Implications for Practice*

We wish to make it clear that we do not interpret these results as in any way denigrating the value of the High/Scope model or similar child-directed models for young children. In fact, in our original intervention comparison study, we found that the cognitively oriented ML model was more effective than DI in serving preschool-age children who entered the program with greater delays in cognitive and language development. In contrast, we found the DI model was more effective for children who entered the program with relatively higher cognitive and language skills. Based on these findings we see an advantage for both types of early education program for young children who are at risk for school failure. Our results indicate young children with disabilities can be provided DI as an aspect of intervention without fear that the method will result in later antisocial behavior. The findings also suggest that Schweinhart et al.'s (1986b) conclusion that DI results in later juvenile delinquency with typically developing children should be viewed with caution until their data are reexamined for the variable of gender. Gender should certainly be considered in studies of juvenile delinquency. Until this is done,

such conclusions lack a scientifically sound empirical base.

### References

- Baratta-Lorton, M. (1974). *Mathematics-their-way*. Campbell, CA: Center for Innovation in Education.
- Bereiter, C. (1986a). Does direct instruction cause delinquency? *Early Childhood Research Quarterly, 1*, 289–292.
- Bereiter, C. (1986b). Mountains of evidence said to contradict study effects of preschool [Letter to the Editor]. *Educational Leadership, 5*, 37.
- Bereiter, C., & Engelmann, S. (1966). *Teaching disadvantaged children in the preschool*. Englewood Cliffs, NJ: Prentice-Hall.
- Bjerregaard, B., & Smith, C. (1993). Gender differences in gang participation, delinquency, and substance abuse. *Journal of Quantitative Criminology, 9*, 329–355.
- Broidy, L., & Agnew, R. (1997). Gender and crime: A general strain theory perspective. *Journal of Research in Crime and Delinquency, 34*, 275–306.
- Burton, V. S., Cullen, F. T., Evans, T. D., Alarid, L. F., & Dunaway, R. G. (1998). Gender, self-control, and crime. *Journal of Research in Crime and Delinquency, 35*(2), 123–147.
- Calhoun, M. L., & Beattie, J. (1987). School competence needs of mildly handicapped adolescents. *Adolescence, 22*, 555–563.
- Canter, R. J. (1982). Sex differences in self-report delinquency. *Criminology: An Interdisciplinary Journal, 20*, 373–393.
- Caprara, G. V., Barbaranelli, C., Pastorelli, C., Bandura, A., & Zimbardo, P. (2000). Prosocial foundations of children's academic achievement. *Psychological Science, 11*, 302–306.
- Casto, G. (1988). Research and program evaluation in early childhood special education. In S. L. Odom & M. B. Karnes (Eds.), *Early intervention for infants and children with handicaps* (pp. 51–62). Baltimore: Paul H. Brookes.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cole, K. N., Dale, P. S., Mills, P. E., & Jenkins, J. R. (1993). Interaction between early intervention curricula and student characteristics. *Exceptional Children, 60*, 17–28.
- Davis, C. A., Brady, M. P., Hamilton, R., McEvoy, M. A., & Williams, R. (1994). Effects of high-probability requests on the social interactions of young children with severe disabilities. *Journal of Applied Behavioral Analysis, 27*, 619–637.

- DeVries, R., Haney, J. P., & Zan, B. (1991). Sociomoral atmosphere in direct-instruction, eclectic, and constructivist kindergartens: A study of teachers' enacted interpersonal understanding. *Early Childhood Research Quarterly*, 6, 449-471.
- DeVries, R., Reese-Learned, H., & Morgan, P. (1991). Sociomoral development in direct-instruction, eclectic, and constructivist kindergartens: A study of children's enacted interpersonal understanding. *Early Childhood Research Quarterly*, 6, 473-517.
- Engelmann, S., & Bruner, E. C. (1974). *DISTAR reading I and II*. Chicago: Science Research Associates.
- Engelmann, S., & Carmine, D. (1975). *DISTAR arithmetic I and II*. Chicago: Science Research Associates.
- Engelmann, S., & Osborn, J. (1976). *DISTAR language I and II*. Chicago: Science Research Associates.
- Farnworth, M., Schweinhart, L., & Berrueta-Clement, J. (1985). Preschool intervention, school success and delinquency in a high-risk sample of youth. *American Educational Research Journal*, 22, 445-464.
- Feuerstein, R., Rand, Y., Hoffman, M., & Miller, R. (1980). *Instrumental enrichment: Redevelopment of cognitive functions of retarded performers*. Baltimore: University Park Press.
- Gersten, R. (1986). Response to "Consequences of three preschool curriculum models through age 15." *Early Childhood Research Quarterly*, 1, 293-302.
- Guralnick, M. (1988). Efficacy research in early childhood intervention programs. In S. L. Odom & M. B. Karnes (Eds.), *Early intervention for infants and children with handicaps* (pp. 75-88). Baltimore: Paul H. Brookes.
- Guralnick, M. (1998). Effectiveness of early intervention for vulnerable children: A developmental perspective. *American Journal of Mental Retardation*, 102, 319-345.
- Haywood, H. C., Brooks, P., & Burns, S. (1986). Stimulating cognitive development at developmental level: A tested, non-remedial preschool curriculum for preschoolers and older retarded children. *Special Services in the Schools*, 3(1-2), 127-147.
- Hechinger, F. M. (1986, April 22). Preschool programs. *New York Times*, 17.
- Hohmann, M., Banet, B., & Weikart D. P. (1979). *Young children in action: A manual for preschool educators*. Ypsilanti, MI: High/Scope Press.
- Jang, S., & Krohn, M. D. (1995). Developmental patterns of sex differences in delinquency among African American adolescents: A test of the sex-invariance hypothesis. *Journal of Quantitative Criminology*, 11(2), 195-222.
- Krogh, S. L. (1997). How children develop and why it matters: The foundation for the developmentally appropriate integrated early childhood curriculum. In C. H. Hart & D. C. Burts (Eds.), *Integrated curriculum and developmentally appropriate practice: Birth to age eight* (pp. 29-48). Albany: State University of New York Press.
- Lawrence, P. A. (1988). Basic strategies for mainstream integration. *Academic Therapy*, 23, 349-355.
- McCarthy, D. (1972). *McCarthy Scales of Children's Abilities*. San Antonio, TX: Psychological Corporation.
- Mears, D. P., Ploeger, M., & Warr, M. (1998). Explaining the gender gap in delinquency: Peer influence and moral evaluations of behavior. *Journal of Research in Crime and Delinquency*, 35, 251-266.
- Mills, P. E., Dale, P. S., Cole, K. N., & Jenkins, J. R. (1995). Follow-up of children from academic and cognitive preschool curricula at age 9. *Exceptional Children*, 61, 378-393.
- National Education Association. (1977). *The DARCEE teacher's guide (preschool series) and DARCEE resource unit materials*. (Project on utilization of inservice education R & D outcomes). Washington, DC: Author.
- Notari, A., Cole, K., Osborn, J., & Sherwood, D. (1996). Adapting Feuerstein's Theories for Preschool: Teaching cognitive and social strategies to young children with disabilities in integrated settings. *TEACHING Exceptional Children*, 28, 12-16.
- O'Brien, R. M. (1999). Measuring the convergence/divergence of "serious crime" arrest rates for males and females: 1960-1995. *Journal of Quantitative Criminology*, 15, 97-114.
- Odom, S. L., McConnell, S. R., McEvoy, M. A., Peterson, C., Ostrosky, M., Chandler, L., et al. (1999). Relative effects of interventions supporting the social competence of young children with disabilities. *Topics in Early Childhood Special Education*, 19(2), 75-91.
- Office of Juvenile Justice and Delinquency Prevention. (1993). *Juvenile justice*. Rockville, MD: Juvenile Justice Clearinghouse.
- Osborn, J., & Sherwood, D. (1984). *Mediated Learning Program for Young Children*. Unpublished curriculum, University of Washington at Seattle.
- Rowland, P. (1982). *The Addison-Wesley Reading Program*. Menlo Park, CA: Addison-Wesley.
- Sandall, S., Schwartz, I., & Joseph, G. (2001). A building blocks model for effective instruction in inclusive early childhood settings. *Young Exceptional Children*, 4(3), 3-9.
- Schweinhart, L., & Weikart, D. (1998). Why curriculum matters in early childhood education. *Educational Leadership*, 55(6), 57-60.
- Schweinhart, L., Weikart, D., & Larner, M. (1986a). Child-initiated activities in early childhood programs may help prevent delinquency. *Early Childhood Research Quarterly*, 1(3), 303-312.

- Schweinhart, L., Weikart, D., & Larner, M. (1986b). Consequences of three preschool curriculum models through age 15. *Early Childhood Research Quarterly, 1*, 15–45.
- Sedlmeier, P., & Gigerenzer, G. (1989). Do studies of statistical power have an effect on the power of studies? *Psychological Bulletin, 105*, 309–316.
- Smith, K. E. (1997). Student teachers' beliefs about developmentally appropriate practice: Pattern, stability, and the influence of locus of control. *Early Childhood Research Quarterly, 12*(2), 221–243.
- Snyder, H., & Sickmund, M. (1999). *Juvenile offenders and victims: 1999 national report*. Washington, DC: Office of Juvenile Justice and Delinquency.
- Triplett, R., & Jarjoura, G. R. (1997). Specifying the gender-class-delinquency relationship: Exploring the effects of educational expectations. *Sociological Perspectives, 40*, 287–316.
- Vygotsky, L. (1962). *Thought and language*. New York: Wiley.
- Yoder, P., Kaiser, A., & Alpert, C. (1991). An exploratory study of interaction between language teaching methods and child characteristics. *Journal of Speech and Hearing Research, 34*(1), 155–167.

## About the Authors

- PAULETTE E. MILLS, Associate Professor, Department of Human Development, Washington State University, Pullman.
- KEVIN N. COLE, Senior Researcher, Washington Research Institute, Seattle.
- JOSEPH R. JENKINS, Professor, College of Education, University of Washington, Seattle.
- PHILIP S. DALE, Professor, Department of Communication Sciences and Disorders, University of Missouri, Columbia.

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