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Article

The fragile foundation of pre- and early-school programs for disadvantaged children

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Abstract: In many countries, pre- and early-school programs are the core of educational disadvantage policy. Such programs aim at preventing educational delays of children growing up under unfavorable socioeconomic circumstances. The programs provide a range of compensational stimulation activities in child care centers and kindergartens, sometimes combined with activities for parents at home. Despite the investment of billions of dollars each year, the educational gap between the rich and poor is widening. The question, then, is whether such programs are really effective. Therefore, studies into the effectiveness of such programs are significant. In this sense, this article reviews two so-called model programs, the Perry Preschool and the Abecedarian programs, which were small-scale experimental programs conducted in the 1960s and 1970s. This review critically analyzes a series of publications written by the projects' staff and reanalyses done by Nobel laureate James Heckman and colleagues. They claim that both programs are highly effective and that their findings can be generalized to other reasonably similar programs. This review shows, however, that both experiments were hampered by several methodological shortcomings, which seriously threaten the reliability and validity of their outcomes. Furthermore, the projects were so exceptional, in terms of circumstances, target groups, budgets, and teacher qualifications, that it is not possible to generalize their results. It is concluded that not just quality research, but especially critical quality research, is imperative. That is, researchers should be more critical with regard to their own work and that of their colleagues, and they should not accept research findings at face value.

Keywords: pre- and early school programs; Early Childhood Education and Care; model programs; Perry Preschool; Abecedarian; educational disadvantage; effectiveness; experiment; validity

1. Introduction

The link between the conditions children grow up under and their scholastic achievement is extensively documented [1–3]. What it all boils down to is that children growing up in unfavorable circumstances achieve lower on virtually all facets of educational careers than their peers who live in more advantageous families and neighborhoods. From a theoretical perspective, this achievement gap is often explained in terms of available 'capital' (or 'resources') [4,5]. Many forms of capital exist, such as educational capital (level of education), financial capital (family income), social capital (relations, networks), cultural capital (participating in cultural activities: museums, theaters, concerts), linguistic capital (language use, availability of books, reading), and religious capital (participating in a religious community) [6]. It is presupposed that the more capital is available in the home situation, the better the educational and life chances are of children.

These differences in chances between social milieus are often felt as unjust [7–9]. Therefore, since the 1960s, a variety of policies have been developed and implemented to prevent and combat educational arrears caused by factors in the home situation of children [10,11]. Unfortunately, the results of all of these efforts (and the investment of enormous budgets) are disappointing. The achievement gap between 'the haves and have-nots' has not closed; on the contrary, according to many recent empirical studies, it has only widened, even more so after the COVID-19 pandemic [12–14].

Partly because of this failing success, the focus of educational disadvantage policies has shifted from the primary to the pre- and early-school phase. As the interventions focusing on primary education in general have not been successful, the belief has taken root that attention should be concentrated on the period before primary school. When children are (very) young, they not only learn better and faster, but everything they learn forms the foundation of all other successive learning. With this shift to focusing on younger children, there also has been a shift from curing to preventing. In particular, the work of James Heckman, professor of economics and Nobel Prize laureate, has contributed to this. According to Heckman [15], 'intelligence and social skills are developed at an early age—and both are essential for success'. In addition, 'Early investment produces the greatest returns in human capital'. 'Providing developmental resources pays dividends for the disadvantaged child and society as a whole by providing better education, health, and economic outcomes'. Famous is his statement, 'Skills beget skills', pointing to the cumulative nature of skills and the trend that those with higher levels of skills receive more learning investments.

2. The Perry and Abecedarian programs

The origin of Heckman's work on compensational preschool programs lies in the early 1960s and 1970s. In 1962, a first so-called model preschool project was initiated by a team of teaching staff, developers, and researchers led by Charles Beatty and David Weikart. The design of this Perry Preschool Project was unique for several reasons. The basis for Perry was one elementary school in Ypsilanti, Michigan. It aimed at promoting the social mobility of disadvantaged African-American children. It was conducted from 1962 to 1967, but the participating children were followed for many years thereafter; a last measurement round took place when they were around 54 years of age. From a methodological perspective, the project can be characterized as an RCT study, a randomized control trial, which is generally seen as the gold standard in research [16]. In five cohorts, a total of 123 children, 3- to 4-year-olds, and their families were randomly assigned to one of two groups, an intervention (or experimental or treatment) group and a control group, with 58 and 65 children, respectively. The high-quality Perry intervention itself lasted for two years and consisted of two elements. During the school year (39 weeks), the intervention group children would work in school on projects each morning (2.5 h), where they planned and executed tasks and then reviewed them collectively. In addition, each week the teachers visited the homes of the children for 1.5 h to improve parent–child interactions at home. Meanwhile, the control group did not receive any treatment [17–19].

In 1972, a second model preschool program was implemented, the Abecedarian project, led by Craig Ramey. Though there were several resemblances, this project also differed substantially from Perry. The project's aim was to examine the extent to which intensive early childhood education could overcome the odds of developmental delays and academic failure for children born into low-income families. Just like Perry, Abecedarian was also a single-site endeavor; its sample included a total of 111 poor, high-risk families in Chapel Hill, North Carolina, whose children were born between 1972 and 1977 and—except for one—were all of African-American descent. In four waves, the children were randomly assigned to an experimental group or a control group, with 57 and 54 children, respectively. The children started in the center as early as 6 weeks of age and stayed there until they entered kindergarten, that is, a total of five years. After that, the children's progress was studied at ages 12, 15, 21, 30, and 35. The activities were provided all day, 5 days a week, 50 weeks per year. Children even attended when they were ill; they then received medical help at the center. In addition, home-center transportation was provided. Abecedarian had strong supervision, a well-designed curriculum, well-trained staff, and was accompanied by an ongoing evaluation. The program focused on the domains of knowledge, language, and behavior. The educational activities themselves were game-based and stressed language development; practices were designed to be highly engaging, fun, and active, with learning happening throughout the day. In addition to activities at the child care center, Abecedarian also provided activities for the mothers at home [20–23].

According to their project leaders, both Perry and Abecedarian were highly successful, which was confirmed by a series of sophisticated reanalyzes conducted by Heckman and colleagues [24,25]. Heckman's publications in particular have been very influential for the discussion about the importance of pre- and early-school education. Without a doubt, they are the most acclaimed and cited studies in the field of preschool programs for disadvantaged children.

Schweinhart et al. [19] conclude that their analyses of the Perry data show that high-quality preschool programs for young disadvantaged children improve their intellectual and social development in childhood and their school success, economic performance, and reduced crime engagement in adulthood. What is important is that these positive effects also play a lasting role in later life; therefore, long-term effects are lifetime effects. According to them, all young children living in poverty should have access to programs resembling Perry. Heckman [26] has found that adults from the experimental group were much more likely to graduate high school, make higher earnings, and go on to college, and much less likely—and this especially was highlighted—to commit crime. Furthermore, they were healthier and had better social and emotional skills. And it was not only the Perry participants themselves who benefited from the program; this was also true for their children. Heckman [26] concludes that 'The best evidence suggests that learning begets learning. Early investments in learning are effective.' and that 'The role of the family is crucial to the formation of learning skills, and government interventions at an early age that mend the harm done by dysfunctional families have proven to be highly effective'. Heckman et al. [27] also pointed to the huge financial returns of investing in preschool programs. They estimated that Perry saved society between $7 and $12 for every $1 invested, mostly as a consequence of reduced crime.

In many respects, Abecedarian's findings resemble those of Perry; however, there also are some relevant differences [23]. From birth to kindergarten entry, at 7 out of 9 measurements, Abecedarian children score significantly higher on an IQ test than control group children. During the school years, Abecedarian children had significantly higher achievement scores in reading and math, had lower rates of grade retention, and had lower rates of placement in special education. At ages 21, 30, 35, and 40, the Abecedarian children showed significantly more favorable outcomes, such as higher rates of holding a skilled job, being employed full-time and/or enrolled in higher education, much lower rates of becoming a teen parent, few reports of depression and illegal substance use, higher academic and cognitive achievement scores, much lower reliance on welfare or public assistance programs, and better overall health. In addition to these positive effects, Abecedarian also produced many null effects. No statistically significant effects were found on high school graduation rates, income, type of employment, marital status, mental or physical health, criminal activity, or substance use. While the most remarkable finding for Perry pertained to the incidence of youth crime, for Abecedarian no statistically significant differences between the experimental and control groups were found. Moreover, in addition to positive and null effects, negative effects were also reported, for instance, that the program children were more aggressive. In general, Abecedarian did not produce the gains in social and emotional development that were reported in other preschool projects.

3. Model programs

According to many, model programs such as Perry and Abecedarian have laid the foundation for numerous later pre- and early-school programs [26]. They claim that these high-quality programs have been demonstrated to be highly effective and thereby have yielded many positive effects on both cognitive and non-cognitive outcomes and therefore may serve as an example—'a flagship', 'a cornerstone', 'a prototype'—for other early childhood education programs [27–29]. According to them, the effects of Perry and Abecedarian can be generalized to later stimulation and compensatory programs for young disadvantaged children. If this really is true, however, remains the question.

The last five decades, hundreds of pre- and early school programs have been developed and implemented, not only in the USA but also in Europe and Asia. Thousands of studies have been conducted to examine their effectiveness. The results are ambiguous, however. Indeed, positive effects have been reported, but also negative effects and many null effects. Furthermore, effects vary per domain; sometimes effects were found for cognitive outcomes, but not for non-cognitive outcomes. In addition, insofar as effects were found, they often only lasted for a restricted period and then faded away [30–41].

Most interesting and relevant is a very recent overview study by Burchinal et al. [42] (also because Burchinal has been involved in the Abecedarian project). They now conclude that their review of 'recent rigorous studies supports much more cautious conclusions regarding the longer-term effectiveness of today's preschool programs' and 'preschool impacts are not unequivocally positive'. Their analyses of four recent RCT-based evaluations of the federal Head Start program 'suggest that not all investments in today's preschool programs will promote the long-term success of children, particularly from low-

income families in the United States'. Regarding Perry and Abecedarian, they warn that generalization from the two model programs to today's programs is limited by differences in size, management, and access to safety net services, elevating the control-group baseline conditions in studies of contemporary programs. Another type of study is lottery studies. Analyses show that for Boston's public pre-k program there were positive effects, but this study had strong methodological limitations; the Tennessee Voluntary Pre-K program (TNVPK) initially had some positive effects, but later on these disappeared and even became negative, and still later the program children even scored substantially worse; a large-scale Head Start evaluation initially produced a positive effect for literacy, but not math and behavior. Longer-term results showed mostly null effects.

All this raises the question of why the positive effects as reported by, for instance, Heckman and colleagues could not be replicated for later preschool programs. Therefore, are these model programs' effects reliable and valid? And is it really possible to generalize these programs' findings to other programs, settings, conditions, and target groups? In the following, a number of limitations of both model programs are brought forward, with an accent on methodology and representativeness.

4. Literature search and analysis

For this review, many publications have been collected and examined, using the snowball method. The author of this article has more than forty years of experience with conducting research into educational disadvantage, with special attention to early childhood education and care. His (digital) bookcase, holding many hundreds of reports and articles specifically focusing on the effectiveness of pre- and early school programs, formed the starting point for an intensive literature search. In this process, the references mentioned in all the relevant publications were taken into consideration as well. In addition, Google Scholar was searched following the citations mentioned there. And lastly, Google was searched using keywords such as 'Perry', 'Abecedarian', 'model programs', 'early childhood education', 'effectiveness', and 'criticism'; in addition, the names of the programs' project leaders and (quantitative) researchers were added, viz. Weikart, Schweinhart, Ramey, Barnett, and Heckman. Contrary to expectations, the resulting relevant number of publications was rather limited (see the References below): There were not many publications that reported quantitative analyses; also, Heckman's extensive list of empirical studies contained many duplicates. The ensuing publications were then critically examined, and notes were made. This eventually resulted in a (growing) overview of distinct limitations. These will be discussed in the next section.

5. Limitations of Perry and Abecedarian

5.1. Target group

Pre- and early-school programs are part of educational disadvantage policies, and in general they serve the same populations. The starting point is that some children receive not enough or not 'the proper' stimulation at home, and, as a consequence, they cannot develop their talents sufficiently. To compensate for this, pre- and early-school stimulation programs are offered in child care centers and kindergartens. Admission to such programs is usually decided on the basis of

demographic indicators, often parental education, income, profession, immigrant status, and race [2,43]. Both Perry and Abecedarian used such indicators. However, Perry used an additional indicator that normally is not used, namely the children's low level of intelligence. According to project leader David Weikart [44], the target group constituted 'culturally deprived Negroes, diagnosed as mentally retarded'. The children's IQ scores were between 61 and 80 points. Therefore, this concerns educationally subnormal functioning children, who normally are referred to special education institutions (certainly at that time; nowadays such children may receive extra support in regular classes). In other words, they are not the children who have the capacities but not the opportunities; they are the children who simply lack the capacities to participate in regular schools. Intelligence also played a role in the Abecedarian project; however, it was not that of the children but of their mothers. On average, the mothers had an IQ of 84 points; 13 mothers even had an IQ of 70 or lower and thus—using the language of the 1970s—also were 'mentally retarded'. The application of intelligence as a target group criterion calls into question the representativeness of both the Perry and Abecedarian samples. In fact, applying this criterion makes both programs rather exceptional, and, therefore, it is not justified to generalize their findings to other populations. Heckman's optimistic suggestion that Perry serves as a cornerstone for other programs [45] certainly is not warranted. But there are more aspects that detract from representativeness.

5.2. Representativeness

Both Perry and Abecedarian have been qualified as model programs. Therefore, the sample of participants should be representative of the population the programs ultimately are meant for. If this is not the case, the results of the analyses into the programs' effects have little meaning; they simply cannot be generalized [46]. Pre- and early-school education is an important, if not the most important, component of educational disadvantage policies, which target children from lower socio-economic and immigrant minority backgrounds. Relevant then is the composition of the Perry and Abecedarian samples. They have a lot in common, with an accent on demographic characteristics. Half of the Perry parents were single mothers; for Abecedarian, this amounted to 70 percent. Except one, all mothers were African American. On average, they were 26 and 20 years of age, respectively, but several were younger than 16. The Perry mothers had had 9 years of education, the Abecedarian mothers 10. Only 20, or 36 percent, of them had a job; for the fathers, this was 14 and 73 percent. All Perry mothers lived below the poverty line; they had, on average, 5 children and lived in with their parents. Abecedarian mothers, on the other hand, mostly only had one child. For the Abecedarian children, another admission criterion was relevant: At the start, that is, as a 6-week-old baby, they had to be completely healthy.

It's evident that both samples consisted of children living in severe economic deprivation, and this not only pertains to the families but also to the neighborhood they lived in. Unique, however, is that (except one) all participants were African American, and that, therefore, program effects can solely be generalized to the African American population. As, for instance, no White, Latino, or Chinese children

were involved in the studies, there is no way of knowing how these ethnic groups would have reacted to the programs. This, thus, is a huge limitation, but, unfortunately, it is not the only one. The core of most pre- and early-school programs concerns stimulation of the children's language development. In many countries, children with an immigration background at home speak the language of their country of origin. When they go to school, they often hardly have any command of the official language of the receiving country. This poses huge problems and challenges for the teachers. According to Ramey [22], all Abecedarian children spoke English at home. The point here is, however, that nothing is known about the specific variety of English. Many African-American children speak two varieties: African-American English (AAE) and General-American English (GAE) [47]. AAE is frequently spoken in the child's home and community; GAE is used in educational contexts and the media. One of the major educational tasks for African American children who speak AAE at home, therefore, is to bridge the two varieties. The exact language situation for Perry and Abecedarian children is not clear, but it undoubtedly will influence the representativeness and generalization of the projects' findings.

5.3. Sample size

Both projects use very small samples; at the start, a total of 123 children participated in Perry, and in Abecedarian even fewer, no more than 111. However, the experimental groups included only 58 and 57 children, respectively. Such small numbers evidently pose a problem when trying to demonstrate the effectiveness of the programs [48]. However, the problem even increased because the children have been followed by the researchers for many years; Perry between 3 or 4 years of age and when they were 54, and Abecedarian between 6 weeks (!) of age and when they were 40. No doubt this is unique, but at the same time disastrous because of the ever-increasing attrition. In the end, there were only 40 and 29 children, respectively, in the experimental group [49].

There was another problem. Perry was an RCT experiment with random assignment of children to an experimental and a control group. The intended randomization protocol was compromised, however, with the consequence that effects could not be trusted [50,51]. To overcome these serious problems, Heckman and colleagues have tried to correct for this by applying all sorts of sophisticated statistical tricks (such as weighting, estimating, and imputation [27,28,52,53]). This is not really convincing, however, especially not when there are only a few respondents in the data set. Of course, there is nothing better than real data [54].

But there is yet another problem: the significance of the outcomes of the analyses. The right level to be chosen depends on the sample size. Because of the small number of children, this probably should be $p < 0.10$ (10% chance of coincidence), but this implies with this (artificially raised) sample a relatively large insecurity [55]. In addition, the strength of the effects is influenced by the sample size: The smaller the sample, the stronger the effects are inflated [56,57].

And there is still another point to consider. Heckman and colleagues have performed many hundreds of analyses. This requires a minimum number of children for each of the variables, which is lacking, however: There are far more analyses than

units. Even more problematic is that when conducting so many analyses, there will always be significant effects—due to chance alone [58,59].

The foregoing comments point to several sample problems at the level of the participating children, but perhaps even more worrisome is the higher level, the level of the schools. Both programs were single-site experiments. There is no information available as to how comparable the Perry and the Abecedarian schools were to the tens of thousands of other preschools, then and now (around 50,000). It can be expected that there is a lot of heterogeneity among preschools (and their environments), and that, therefore, generalization of Perry's and Abecedarians' findings will pose a huge problem [38,60,61].

5.4. Intelligence

Apart from being a critical admission criterion, intelligence still played another role in both model programs. An important goal for Perry was to raise the children's intelligence level; however, this goal has not been realized. Though the children showed an increase of IQ while participating in the program, this effect faded out shortly after the transition of the children to elementary school [62]. In the Abecedarian program there also was an emphasis on the children's intelligence development. Therefore, their intelligence was measured ten times during the duration of the program and then another five times when they were 6.5, 8, 12, 15, and 21 years of age. During the program, four different tests were used; children were observed and mothers interviewed. Testing very young children by definition is a perilous undertaking. The question is how objective, reliable, and valid the results are [63]. As nearly all participants were African-American, it is also relevant to critically consider how culturally and linguistically responsive all these tests (and other measurement instruments used) were [64]. A complicating factor was that the mothers were always present at the test administration and that by testing so many times, a learning effect ('teaching to the test') probably occurred [65]. Yet another complication is whether the results of the four differing tests, with each of them having different dimensions, may be compared like these researchers did.

And then there is yet another problem. Four cohorts of children participated in Abecedarian. The researchers discerned two categories, an experimental and a control group, and these were compared with each other. However, combining the four cohorts is being criticized: The four cohorts should be analyzed separately [66]. Abecedarian's staff reported significantly higher IQ scores of the experimental group; what they did not mention, though, was that the progress only occurred for the first two cohorts. In fact, the scores of the children in the experimental group of the last two cohorts even deteriorated. In situations with small samples, it is often useful to combine groups to give the analyses more body and to increase their reliability. (This was also done in the Perry analyses. Between 1962 and 1967, five cohorts of 3- and 4-year-olds participated. In the analyses, they were all lumped together. From the above it becomes clear that this is not always an adequate strategy, as general conclusions may then be misleading. This also appeared from analyses of sex differences in intelligence scores. A clear pattern occurred: For women, there were significant long-term effects, while for men they were much weaker and not

consistent, sometimes even negative. And there is another example of differential effects. On the basis of analyses of data collected up until the participants were 21 years of age, the researchers concluded that the program had resulted in positive and lasting effects with regard to cognitive and school-related outcome measures. Reanalyzes showed, however, that the effects were concentrated in the group of children with low-IQ mothers (scores of 70 and lower), that they decreased in strength with the passing of time, and that ultimately only a few remained.

5.5. Parental participation

Most pre- and early-school programs are executed in child care centers and kindergartens; many have no or only a restricted home/parent component. For both model programs, however, parental participation and involvement constituted an essential part. According to Heckman et al. [53], the Perry children 'generally lacked adequate parenting'. Elsewhere, Heckman [26,50] writes of 'failed parents' and 'the harm done by dysfunctional families'. In Heckman [67], he complains of 'poor parenting practices'. Perry staff members visited the parents, in general the mothers, every week for one and a half hours. This aimed at improving parent–child interactions by involving the mothers in the learning process and by helping them to implement the preschool curriculum at home. It was assumed that parental involvement and participation would lead to more trust and higher ambitions and expectations, and that, as a consequence, the children's motivation would increase and their achievement would improve.

The parents, mostly mothers, also played an important role in the Abecedarian program, though not always an active one—on the contrary. Everything concerning health and safety was taken over by the project staff. If specialized help was needed, for instance regarding language, socio-emotional development, and medical help, the project staff arranged this. The project also provided home—preschool transportation. The parents even received help when there were problems regarding housing or food. They could use libraries for books and toys. In addition, there were regular meetings, for instance, for the whole group, for discussing special topics, and for parents and teaching staff. This all means that the mothers were taken much off their hands, in addition to the fact that their children were all day, 5 days a week, and 50 weeks a year at the preschool. Because of this nearly unlimited freedom or exemption, they were in the position to spend a lot of time on their personal development, for instance, by starting a course or even a full-time education. According to some, this is the most important return of the Abecedarian program [68].

Because parental participation was such an important part of the model programs, it is not clear to what degree the effects that were reported were a result of the preschool component or the parent component, or both. As the latter component is often lacking in pre- and early-school programs, it is not clear what the implications are for generalizing the Perry and Abecedarian effects. It probably is true to say that the model programs' findings cannot be generalized to other programs without a considerable parent part.

5.6. Teachers

In many countries, preschool teachers have an associate's degree. But because of teacher shortages, this is not always the case today. The (lead) Abecedarian teachers had had training in early childhood education and previous experience as preschool or elementary school teachers. The Perry teachers all possessed three teaching certificates, for preschool, for elementary school, and for special education. Furthermore, Perry and Abecedarian staff received continuous coaching and ongoing training, and there also was a lot of consultation with the projects' scientific staff. How realistic is it that other preschools have the same, clearly overqualified and expensive, staff? This raises another important question. Researchers [19,26] reported significant positive effects. It does not become clear which part of them is attributable to the program itself and which part to the (exceptional) knowledge and skills of the teachers. Numerous studies have shown that in explaining students' achievement, the quality of the teacher matters most [69,70]. So, if the Perry teachers only had the 'normal' basic qualifications, would there have been the same effects?

The teacher–child ratio in both model projects was rather low; in many countries this is 1:8, or even (much) more [71–73]. The official ratio depends on the age of the children. In the Perry project (3- and 4-year-olds), it was 1:5 to 6. For Abecedarian, the teacher–child ratio for babies was 1:3, for infants 1:4, and for toddlers 1:6. In addition, the projects' (scientific) staff provided a lot of support for both the children and their parents. Abecedarian also provided help from social work, nurses, pediatricians, and physiotherapists.

5.7. Current relevance

Perry was conducted between 1962 and 1967, and Abecedarian was conducted between 1972 and 1977. That is quite some time ago, and it inevitably raises the question of whether something that was developed, implemented, and evaluated sixty and fifty years ago is still relevant and applicable today. According to some, this question can be answered positively. Much has been learned from both projects; learning and development start early, are cumulative, and have consequences for later learning. Therefore, a comprehensive approach that starts early is needed. It is also mentioned that many elements of the programs are the foundation of later programs [74]. Others say, however, that the model programs and modern programs are incomparable in terms of budget, qualifications, quality, duration and intensity, and scientific support. Moreover, the populations and circumstances then and now differ substantially [33]. For instance, the parental level of education has increased; the number of working mothers has grown; the availability and quality of child care have improved. According to critics, it is impossible to achieve comparable results with programs that are much cheaper and differ in many respects and work with different target groups and under different circumstances. Indeed, since then, there has been no study that supports Perry's and Abecedarian's conclusions [75,76].

5.8. Price tag

Advocates praise Perry and Abecedarian for their exceptional high quality; other preschool programs should take an example from them. But, of course, high quality

comes with high costs. The Perry children participated a total of 1000 h in the preschool program. The Abecedarian children, on the other hand, attended no less than 12,500 h. In addition, after the children had moved on to elementary school, they received various forms of intensive support for another three years.

The price of this, of course, is correspondingly high. Participation of one child in Perry cost a total of $43,500; for Abecedarian this was no less than $120,000 per child, while attending a current full-day, high-quality pre-k program typically costs around $15,000–16,500 (in 2023) [77]. There are several calculations that show that every dollar invested has paid for itself many times what it had cost, especially because of the expenses saved because the Perry children committed significantly fewer crimes (in particular, murders) [38]. Heckman et al. [27] estimated that for every dollar invested in Perry, society would save between 7 and 12 dollars. It should be noted, though, that such a crime effect was not found for the Abecedarian program [21].

Karoly [78], however, warns that performing such cost-benefit analyses is no easy endeavor and is met with several challenges. She shows that results for one preschool program won't necessarily be comparable to the results for another. Researchers often measure different outcomes and analyze different follow-up periods; moreover, there is the question of scale and quality. And then, what's also important is that the situation and context in the 60s and 70s differ substantially from that in later decades, not only in terms of the living conditions of disadvantaged (Black) families but also of the quality and availability of preschool education. For such reasons, the evidence for economic returns from preschool programs is mostly a matter of apples-to-oranges comparisons. Karoly therefore concludes that in the present context, it may be more realistic to expect returns in the range of $3 to $4.

In this connection, Whitaker et al. [77] point to another recent development that may influence the economic returns in a negative way. According to them, evaluations of recent preschool programs produce puzzling findings. Although some have found positive impacts, others have produced null or even negative impacts; that is, children attending preschool programs showed significantly lower school achievement and worse behavior when compared with children who did not. Such findings are not in line with those from the two demonstration programs from the 60s and 70s that are central in this study. Whitaker et al. [77] conclude: 'Perhaps a central lesson learned is that it is unreasonable to expect similar results from demonstration programs funded at high per-child levels given current preschool funding levels are substantially lower. This alone may require researchers, policymakers, and practitioners to adjust expectations on what today's programs can produce in terms of promoting children's development'.

To put things into perspective, Masse and Barnett [79] estimated that if all target children in the USA were to attend Abecedarian, this would cost a total of 90 billion dollars per year. A major problem then is that members of government are not prepared to wait for 30 or 40 years and see whether their policies have been successful and whether the former preschool children indeed have become less criminal and thereby have saved society a lot of money [78]. Members of government normally live for the moment (four years max) and are foremost interested in initiating new

policies and not necessarily in investing taxpayers' money in projects that maybe will yield a return in the very long run.

5.9. Racist and deficit perspectives

From an anti-racist perspective, both model programs have received criticism [80]. All participants were African-American children living in severe poverty. According to the critics, this would suggest (or even confirm) that such a disadvantage is exclusively a 'black' problem and that the children's parents must be blamed for this. (It even might suggest that Black people are inherently 'bad' or 'criminal'). And this is exactly what Nobel laureate James Heckman does. In, for instance, Heckman [26,50], he calls them 'failed parents' and speaks of 'the harm done by dysfunctional families'.

Another but related point of criticism concerns the educational-sociological approach both programs departed from, the so-called deficit approach. This implies that the culture in Black families is inferior as compared to that of White families. According to this view, Black children should be re-educated in such a manner that they fit in the White middle-class school norm. The critics are of the opinion that such a discriminatory vision does no justice to the uniqueness of the Black underclass.

5.10. Mother-child separation

There also is an ethical question, which is actually never being raised: What has participating in the Abecedarian program done to the mother–child relationship? The children went shortly after birth to the preschool center for five years, five long days a week, and fifty weeks per year. (Also when they were ill. And they were transported from home to preschool, v.v. This implies that the mothers saw their children mainly on the weekend; the remainder of the time they stayed with 'strangers'. The question is what this virtually permanent separation has done for their bonding, intimacy, and child-rearing, both from the perspective of the mothers and the children.

6. Conclusion

Perry and Abecedarian were indeed unique preschool programs. According to, for instance, Heckman, they form the foundation for later programs, and their findings can be generalized to other 'reasonably similar' programs. The present critical review shows, however, that both experiments were hampered by several methodological shortcomings, which seriously threaten the reliability and internal validity of the outcomes. Furthermore, the projects obviously were so exceptional, for instance in terms of circumstances, target groups, budgets, and teacher qualifications, that it is impossible to generalize their results; in other words, both projects have an unacceptably low level of external validity.

What does all this mean? Educational disadvantage is high on the political and societal agenda. For several decades, billions of dollars have been invested yearly. Hundreds of interventions have been developed, implemented, and evaluated. The results are ambiguous and disappointing, however. At the same time, it is clear that the disadvantage gap is not closing but widening. The future of our children and grandchildren is at stake. Therefore, it is imperative that practitioners working with

young children can rely on evidence-based ECEC interventions. The situation is obviously much more complex than many people, including politicians, members of government, and policymakers, assume. This review suggests that part of the problem lies with the researchers involved. They should be much more critical in advocating findings from studies that they perhaps have not read well or that they do not understand. Often, researchers conclude that more research is needed. This is not necessarily so. More quality research is needed, for instance, sophisticated, large-scale experiments to find out which programs are effective and which are not, and under what circumstances effects occur. It is imperative that practitioners working with young children can rely on evidence-based ECEC interventions.

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