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The Long-Run Effects of High-Quality Pre-K: What Does the Research Show?

Timothy J. Bartik, Senior Economist
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Presentation to the Michigan State Board of Education, June 14, 2022.

Thank you for the opportunity to present to you this morning on this important topic: how preschool affects future outcomes for children.

Preschool's effects have been much studied. As in any research, there are studies that may seem to reach results that differ, and a key question is how these differences can best be interpreted.

For preschool effects, seemingly quite different results come from the two most recent high-quality studies of preschool in Tennessee and Boston.

The Tennessee study, based on a randomized control trial of students who were in preschool in 2009–2010 or 2010–2011, found that Tennessee's preschool program had positive effects on test scores at the end of preschool, but then in subsequent years, through 6th grade, had zero or negative effects on test scores and behavior ([Durkin et al. 2022](#)).

The Boston study, based on a randomized control trial of students who were in preschool between 1997–1998 and 2003–2004, found that Boston's program had large effects on long-run educational attainment ([Gray-Lobe, Pathak, and Walters 2021](#)). Boston's pre-K program increased high school graduation rates by 6 percentage points, college attendance rates by 5 percentage points, and college graduation rates by 5 percentage points.

Despite these seeming contradictions, the overall research evidence on preschool is consistent with the following consensus conclusion: HIGH-QUALITY preschool has LONG-RUN effects on former child participants' ADULT OUTCOMES. What should be emphasized here is that only high-quality preschool has these outcomes. Furthermore, the effects of preschool are most evident not in test scores, but in more "authentic" adult outcomes such as educational attainment, involvement in crime, and adult earnings. The most recent Tennessee and Boston results are consistent with that consensus—that quality preschool works in the long run.

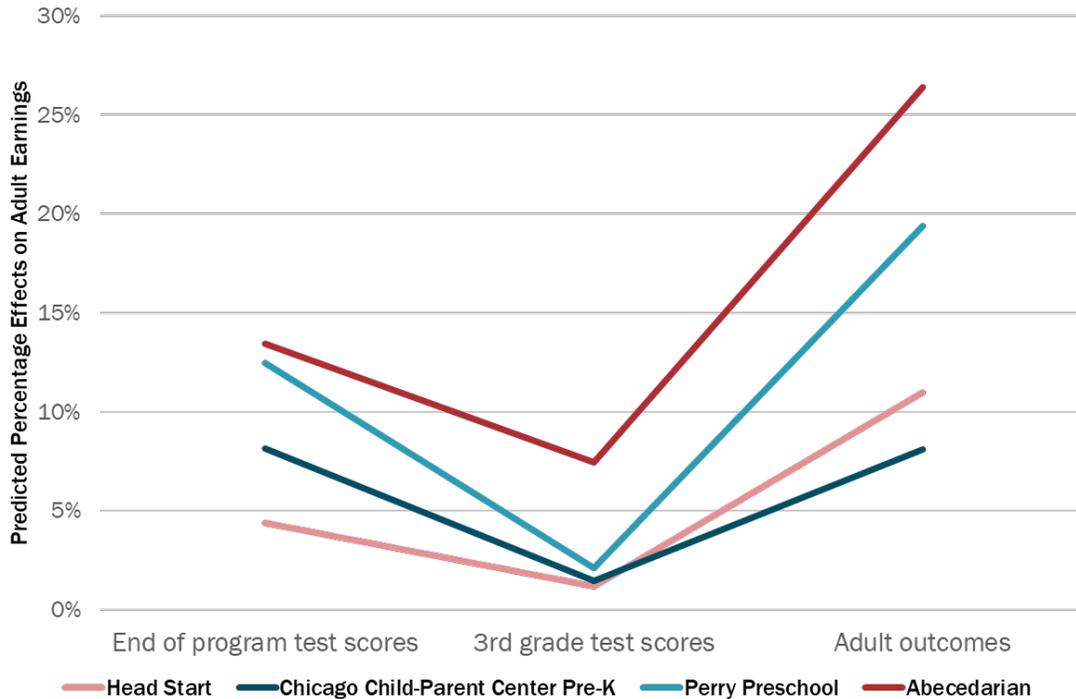
An important finding from the most rigorous studies of high-quality preschool programs is that test score effects of preschool often fade significantly after kindergarten, even as early as 3rd grade. But then effects of preschool reemerge in high school, resulting in improvements in important "authentic" outcomes such as whether someone graduates from high school, goes to college and graduates, and gets a good job.

The figure below, from my book [From Preschool to Prosperity](#), looks at four high-quality pre-K programs with good research evidence on BOTH short-run and long-run effects, and compares the ACTUAL effects of the program on adult earnings, with the PREDICTED adult earnings effects based on test score effects as of the end of the pre-K program, as well as at 3rd grade. The

four programs include the Perry Preschool program, the Abecedarian child care and preschool program, Head Start, and the Chicago Child–Parent Center preschool program.¹

Test scores generally underpredict the actual long-run earnings effects of high-quality pre-K programs.

Predicted Percentage Effects on Adult Earnings based on Outcomes at Various Times



SOURCE: Bartik’s calculations, based on research described in text and notes, 2014

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As the figure shows, the test score effects generally underpredict the long-run earnings effects, which range from 8 percent to 26 percent across the four programs. This underprediction is much worse at 3rd grade, where we see much fading from the earnings effects that we would predict based on test score effects immediately after the pre-K program ends. Adult earnings effects of all four programs are many multiples of what would be predicted based on very modest 3rd grade test score effects.

¹ Bartik (2014) provides sources for these estimates. Perry Preschool was a randomized experimental study of half-day preschool at ages three and four, operating in the 1960s in Ypsilanti, Michigan. Abecedarian was a randomized experimental study of full-time, full-year child care and preschool from six weeks of age to age five, operated in the 1970s in Chapel Hill, North Carolina. The Head Start program was a large-scale preschool program started in 1965 and continuing today. The long-run estimates here are based on children in Head Start in the 1980s, from Deming (2009). The Chicago Child–Parent Center program was a large-scale half-day preschool program, with half the children only participating at age four, and the other half participating for two years. It started in the 1960s, but the long-term estimates here are based on participants in the 1980s.

How can we interpret this test score fading, which is then followed by recovery of pre-K's effects when we get to adult earnings? I think the best interpretation is that pre-K leads to so-called soft skills (or social skills) improving, and then these soft skills build on themselves. Children who go to high-quality pre-K as a result have not only higher literacy and math test scores at kindergarten entrance, but they also have higher soft skills, such as being better able to deal with their peers and the teacher, along with stronger self-confidence. As a result, the child does better in kindergarten, which further builds their self-confidence and their skills in dealing with other people. And these effects cumulate over time. Eventually, these higher soft or social skills result in someone who is better at dealing with coworkers, customers, and supervisors, all of which pays off in greater employability and higher earnings.

As Nobel Prize-winning economist James Heckman put it, “skills beget skills” through a process of cumulative causation, and this is particularly true of social or soft skills ([Heckman, 2012](#)).

Beyond this finding of fading and recovery of preschool effects, several other findings of preschool research have important policy implications and should be taken into account by policymakers. These include the following:

Quality matters. This finding, that preschool has large long-run benefits, has only been found for high-quality programs. All of the programs in the figure are regarded as high quality in that they have trained and well-paid teachers and a well-developed curriculum. Other research has shown greater effects of preschool programs that are judged by outside observers to be high quality ([Bartik and Hershbein 2018](#)).

Preschool has super-long-run intergenerational effects. Recent research shows that Head Start not only affects children who participate, but it also affects their children, who are the next generation ([Barr and Gibbs, forthcoming](#)). The children of Head Start children have increased education attainment, lower teen pregnancy, and less criminal activity. These children's effects, from their indirect exposure to Head Start via their parents, are similar in size to their parents' effects. In other words, for at least some families, Head Start broke the cycle of poverty.

High-quality pre-K has synergistic effects with higher-quality K-12—that is, investments in one increases the return to investments in the other. In recent research, Head Start has more of an impact when K-12 spending is higher due to court orders ([Johnson and Jackson 2019](#)). In the other direction, court-ordered increases in K-12 spending have more effects for children who participate in Head Start. To illustrate the magnitudes, Head Start normally increases high school graduation rates by 11 percentage points; if K-12 spending is ordered by the courts to increase by 10 percent, then the Head Start effect on high school graduation goes up by over one-third, to 15 percentage points. For K-12 spending, a 10 percent increase in K-12 spending increases high school graduation rates by 7 percentage points for low-income students without access to Head Start, but this effect goes up by over one-half for low-income students in Head Start.

Sparse evidence suggests that pre-K adult benefits in dollar terms may be similar for low-income and middle-class groups, but greater in percentage terms for children from low-income families. Because the more-researched preschool programs have typically been targeted on low-income families, preschool effects on children who are middle income and above have

received less research attention. A few studies suggest that effects on different income groups may be similar. For example, one study found that test score effects of preschool at kindergarten entrance would predict similar “dollar effects” on future adult earnings for both low-income and middle-class children ([Bartik, Gormley, and Adelstein 2012](#)). Although the predicted dollar effects on future earnings are similar across income groups, the *percentage* effects on future earnings would be greater for children from lower-income families, as their expected baseline lifetime earnings are lower.

In the previously mentioned Boston study, the effects of preschool on high school graduation rates were similar for students who were middle-income versus lower-income students ([Gray-Lobe, Pathak, and Walters 2021](#)). Preschool effects on college enrollment and college graduation were somewhat smaller for lower-income students than for middle-income students, but the differences were not statistically significant.

“Universal” preschool programs have higher test score effects than “income-targeted” preschool programs. In a study comparing state pre-K programs, programs in states that provide universal access, regardless of student income, tend to have higher immediate test score effects, compared to state programs that were targeted based on the income of the child’s family ([Cascio, forthcoming](#)). These differences were particularly strong for low-income children, who benefited more from programs that did NOT target their income group.

Why these differences between universal versus targeted preschool? One possibility: income-integrated pre-K classrooms may have stronger peer effect benefits, which particularly benefit lower-income children. Another possibility: income-integrated pre-K programs may have stronger political support and higher parental pressure for improving quality.

How do the Boston and Tennessee studies fit into this research consensus? Very well, once we recognize that the Boston research looks at the long-term impacts of a high-quality program, while the Tennessee research looks at the intermediate test score impacts of a program that is lower in quality.

Boston’s pre-K program has been widely recognized as being high quality. In Boston’s pre-K program, the teachers have the same educational requirements and pay scale as Boston’s K-12 teachers. Based on studies of the program, all teachers receive extensive curriculum training, and also receive “weekly to biweekly on-site support from an experienced early childhood coach trained in [the program’s] curricula” ([Weiland and Yoshikawa 2013](#)). The program also has high spending per student, equivalent in purchasing power in Michigan today to about \$12,000 per pre-K student per year.²

The Boston program is also universal, which, based on the research cited above, is likely to improve both peer support and political pressure for higher program quality.

² This adjusts the reported figure of \$13,000 per student in Boston, as of 2020, from Gray-Lobe, Pathak, and Walters (2021). I adjusted from “Boston dollars” to “Michigan dollars” using the “Regional Price Parities” of the U.S. Bureau of Economic Analysis. I then adjusted from 2020 dollars to April 2022 dollars using the Detroit Consumer Price Index published by the U.S. Bureau of Labor Statistics.

Finally, the Boston program also shows the common pattern of test-score fading and recovery. Boston's pre-K program has test score effects during the preschool year, but these effects faded later on, and were no longer statistically significant by 3rd grade (Gray-Lobe, Pathak, and Walters 2021).

Furthermore, although Boston pre-K does not lead to persistent K-12 effects on test scores, the program does appear to improve student behavior at school, leading to a lesser number of high school suspensions, and improving an overall index of student behavior. This Boston finding is consistent with the "soft skills story" for why preschool has cumulative long-run effects on adult behavior, despite fading test score effects.

Tennessee's program was an income-targeted program; children had to be below 185 percent of the poverty line. Based on the research previously cited, this relatively tight income-targeting would tend to be associated with lower immediate test score impacts. Tennessee's program also had some significant positive immediate test score impacts, but in this case were followed by complete fading of positive effects, and in fact followed by some negative effects.

Part of the problem with Tennessee's program was that it may have been low quality, at least during the period being evaluated. (The students in the evaluation would have been in preschool during the 2009–2010 and 2010–2011 school years.) According to Dale Farren, one of the authors of the Tennessee study, "The state didn't have a coherent vision [for preschool]...Left to their own devices, each teacher was inventing pre-K on her own....The most common activity in [preschool] classrooms was transition, moving children from activity to activity with no learning opportunity during that time" ([Kirp 2022](#)).

Based on preschool classroom observations in Tennessee during the 2009–2011 period, 85 percent of the classrooms observed scored less than "Good" quality on a classroom rating scale. ([Farran et al. 2014](#)).

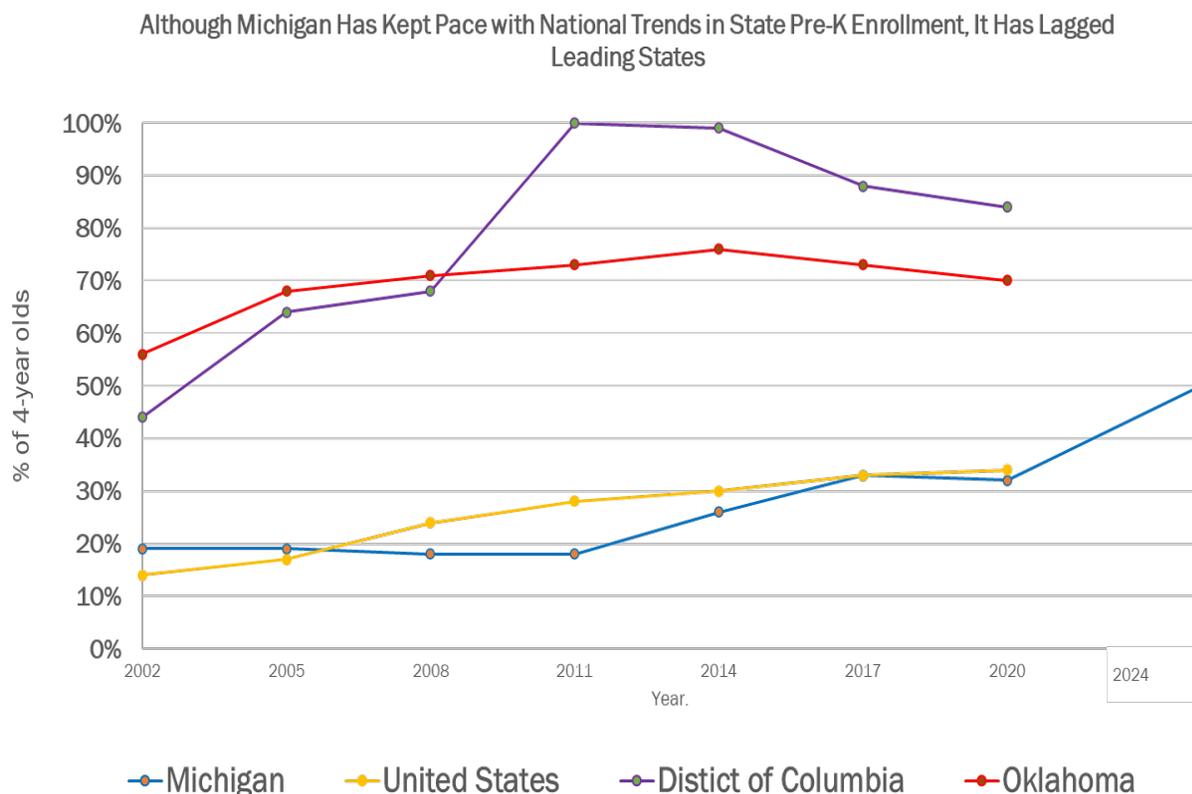
Finally, it seems likely that many of the K-12 school districts in the Tennessee study may not have been particularly high quality. If so, this also would tend to reduce pre-K's impact beyond the preschool year.

The Tennessee study certainly presents an important lesson: lower-quality pre-K may not produce good results, at least in terms of test score impacts and behavioral impacts. But the lack of test-score-effects of low-quality pre-K should not be used to infer that high-quality pre-K lacks long-run impacts. Rather, the lesson policymakers should draw is that it is essential to design, fund, and run pre-K so that it is consistently of high quality.

How is Michigan doing on design, funding, and management of pre-K so that it is high quality? One element of design is pre-K access. Broader access to pre-K is important because more participation means more aggregate impact, and because closer-to-universal access is associated with higher per-participant impacts, as described previously. Michigan's program is targeted at families less than 250 percent of the poverty line, which is income-targeted, but includes over half of all Michigan four-year-olds. Furthermore, Michigan's Great Start Readiness Program (GSRP) program allows programs to enroll up to 15 percent of children above that 250 percent

of the poverty line threshold, which moves the program further toward universality. Finally, the GSRP program requires prioritization for enrollment of lower income children—but as access in Michigan has expanded, more families at wider varieties of income levels can access GSRP.

As the figure below shows, Michigan’s pre-K over the past 20 years has significantly expanded the percentage of all Michigan four-year-olds who are in GSRP. However, this figure also shows that Michigan has generally just kept pace with the national trends toward expanded pre-K access. In addition, Michigan is behind the leading states. Currently, Michigan is 19th in the country, and is well behind D.C. and leading states such as Oklahoma ([NIEER 2022](#)).



SOURCE: National Institute for Early Education Research, 2022, and projections based on Michigan’s plans.

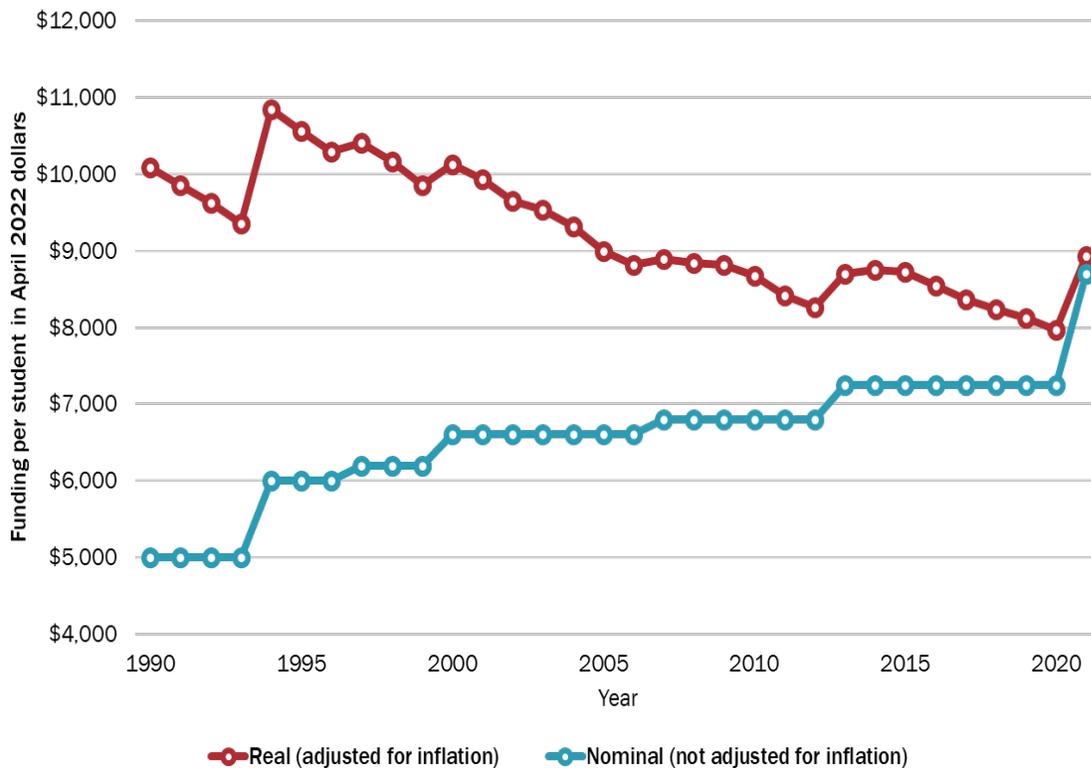
If the proposed expansion of GSRP by 22,000 slots takes place over the next three years, by the 2023–2024 school year, Michigan’s pre-K enrollment, as a percent of all four-year-olds, would be boosted from a little over 30 percent to around 50 percent. This would move Michigan’s percent enrollment from 19th up to 9th in the country, behind D.C., Oklahoma, Iowa, Florida, Vermont, West Virginia, Wisconsin, and Georgia.

Adequate funding for pre-K may not ensure quality, but adequate funding is needed for quality to be possible at a large scale. In particular, sustained adequate funding is needed to enable pre-K teachers to be paid sufficiently well to attract and retain quality teachers, and to provide teachers with the curriculum materials and training supports that are needed for quality.

Michigan funding for pre-K has suffered from being fixed in nominal terms for many years, which allowed the real funding to significantly decline. As shown in the below figure, for much of the 1990s, real funding per child in GSRP averaged, in April 2022 dollars, about \$10,000 for a full-day slot. But then real funding declined because inflation eroded the value of a nominal per child allocation that often stayed fixed for many years. From 2005 on, real GSRP funding per child per full-day slot generally has been between \$8,000 and \$9,000.

Real funding for the Great Start Readiness Program has significantly declined since the 1990's.

Full-Day Equivalent Great Start Readiness Program (GSRP) Funding per Student



SOURCE: Bartik's calculations using GSRP historical data and Detroit CPI (real in April 2022 \$)

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For the 2021–2022 school year, GSRP nominal funding was significantly increased due to being made equal to the foundation grant per K-12 student. Ideally, GSRP funding per full-day slot should be *greater* than the K-12 foundation grant, as class size and student-teacher ratios need to be lower for pre-K classrooms than is typical in K-12.³ I would recommend setting GSRP funding at one-third higher than the state minimum foundation grant for K-12. But, at the very least, GSRP funding per full-day slot should keep pace with K-12 funding.

³ This is consistent with the recommendations of the School Finance Research Collaborative ([Augenbach Palaich and Associates 2021](#)).

What about other dimensions of quality, other than breadth of access and funding levels per student? The National Institute of Early Education Research (NIEER) has 10 quality standards for pre-K, which look at issues such as early learning standards, curriculum supports, teacher credential requirements, class sizes and student-teacher ratios, and child screenings. Michigan's GSRP program meets 10 out of 10 of NIEER's quality standards ([NIEER 2022](#)). Only four other states meet all 10 standards. The typical state meets 7 out of 10 of the NIEER quality standards.

Based on research, it seems fair to say that these quality standards are minimum standards that help contribute to higher-quality programs but do not ensure it. For example, the NIEER standards include a standard for "staff professional development," which is an indicator for whether such training is required, not an evaluation of the intensity and quality of such training.

One idea I would offer for helping support high-quality preschool in Michigan is to fully fund at least *weekly* teacher coaching and mentoring. As mentioned, this is one feature of Boston's high-quality pre-K program: frequent visits by an experienced early childhood educator to classes to work one-on-one with individual pre-K teachers.

In Kalamazoo, the private nonprofit Kalamazoo County Ready 4s, or KC Ready4s, regularly provides teacher mentoring services to preschool programs in Kalamazoo County.⁴ Based on conversations with KC Ready4s' staff, and with Kalamazoo area preschools, this teacher mentoring is highly valued by preschool teachers and preschool administrators.

GSRP also currently provides funding for teacher coaching/mentoring via funding for Early Childhood Specialists. However, this funding is not at a sufficient level to expect weekly classroom visits throughout the state.

Weekly teacher coaching and mentoring is particularly important right now due to the disruptions in the pre-K sector from the pandemic and inflation. The sector has experienced high turnover and has many new teachers. These new teachers often need frequent and intensive mentoring/coaching. Over time, the need for such frequent coaching and mentoring may recede, and will do so to a greater extent if the state expands GSRP funding so that it is some multiple greater than one of K-12 minimum foundation funding, to reflect the necessarily lower student-teacher ratios. Higher funding would allow higher teacher salaries, which would reduce teacher turnover.

In conclusion, for policymakers, the key finding from preschool research is as follows: high-quality preschool pays off for former child participants in the long term in better adult outcomes, such as higher earnings. Policymakers should ensure that publicly funded preschools are high quality, which can be promoted by supporting broader access, adequate funding per child, and high-quality supports to improve teaching.

⁴ I was involved with the committee that helped set up KC Ready4s in 2010 and served on their board until 2020.

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