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Processes of Early Childhood Interventions to Adult Well-Being

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This article describes the contributions of cognitive–scholastic advantage, family support behavior, and school quality and support as processes through which early childhood interventions promote well-being. Evidence in support of these processes is from longitudinal cohort studies of the Child–Parent Centers and other preventive interventions beginning by age 4. Relatively large effects of participation have been documented for school readiness skills at age 5, parent involvement, K-12 achievement, remedial education, educational attainment, and crime prevention. The three processes account for up to half of the program impacts on well-being. They also help to explain the positive economic returns of many effective programs. The generalizability of these processes is supported by a sizable knowledge base, including a scale up of the Child–Parent Centers.

Growing evidence that early childhood experiences can improve adult well-being and reduce educational disparities has increased attention to prevention (Braveman & Gottlieb, 2014; Power, Kuh, & Morton, 2013). Early disparities between high- and low-income groups are evident in school readiness skills, which increase substantially over time in rates of achievement proficiency, delinquency, and educational attainment (Braveman & Gottlieb, 2014; O'Connell, Boat, & Warner, 2009). In this article, we review evidence for three major processes by which early childhood interventions (ECIs) promote well-being and reduce problem behaviors. These are (a) cognitive advantage, (b) family support behavior (FS), and (c) school quality and support (SS).

The accumulated research widely supports these processes as critical targets of preventive interventions for children growing up in economically disadvantaged contexts. Our perspective on promoting well-being is informed by three decades of studying the Child–Parent Centers (CPC), a large-scale program providing comprehensive education and family services to low-income children from preschool to third grade. CPC's success in promoting well-being and high economic returns is documented in the Chicago Longitudinal Study (CLS), which has tracked 1,500 families into adulthood. We also draw on the accumulated life course research on the benefits of primarily center-based ECIs, as well as contemporary programs and practices.

Consistent with prevention research, well-being is used to describe the multidimensional outcomes of ECI, including school achievement and attainment, socioemotional development and mental health, and health behavior. We regard well-being as not just the absence of negative outcomes but the presence of positive ones. Strengthening processes can promote lifelong good health and reduce the risk of social, emotional, and behavioral problems (O'Connell et al., 2009). We use the term *process* to describe how ECI affects later well-being. Documenting processes or mechanisms can improve program design. Paths that are identified can contribute to improvement efforts. Understanding processes also can increase generalizability. If

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results across studies share a common process, expansion would be more likely to be successful.

Three Processes of ECI Impacts

In recognition of the complex array of factors during and after program participation that account for long-term effects, research has increasingly emphasized examination of a comprehensive set of child, family, and school-related processes. This led to the development of the 5-hypothesis model of intervention (5HM; Reynolds, 2012). Derived from the accumulated research on ECI over four decades, 5HM posits that effects are explained by indicators of five general paths of influence: cognitive–scholastic advantage (CA), FS, SS, motivational advantage (MA), and social adjustment (SA).

Because the major purpose of ECI is to promote enduring effects into adulthood, the extent to which this pattern is observed will depend on the magnitude of effects on one or more of the processes. As shown in Figure 1, we emphasize the contributions of CA, FS, and SS due to their strong evidence as processes. The contributions of MA and SA are usually initiated by the other three. Space limitations also necessitate this focus (see Ou & Reynolds, 2010; Reynolds, 2012). To be valid explanations, paths must be independently associated with both program and outcome measures. The hypotheses could work in combination. For example, participation may affect parent involvement through early CA, just as parent involvement and CA may link directly to SS. Although substantial support exists for the independent and combined influence of the processes, the pattern is expected to vary depending on goals, program content (e.g., family vs. center-based), and implementation fidelity. The summary of evidence for the three processes, which are not rank ordered, is followed by a review of findings from a variety of interventions.

Cognitive–Scholastic Advantage

Effective ECIs provide systematic, activity-based educational experiences that stimulate children's emerging cognitive, language, numeracy, and social skills. All of these skills are necessary for optimal school readiness. Decades of research have linked participation in effective ECIs to CA and reductions in the achievement gap among high-risk populations (Camilli, Vargas, Ryan, & Barnett, 2010; Reynolds, 2012, p. 19). CA promotes effective and smooth school transitions that provide cumulative advantages in adjustment and performance by enhancing later learning, increasing teacher expectations of performance, promoting school commitment and stability in learning environments, and

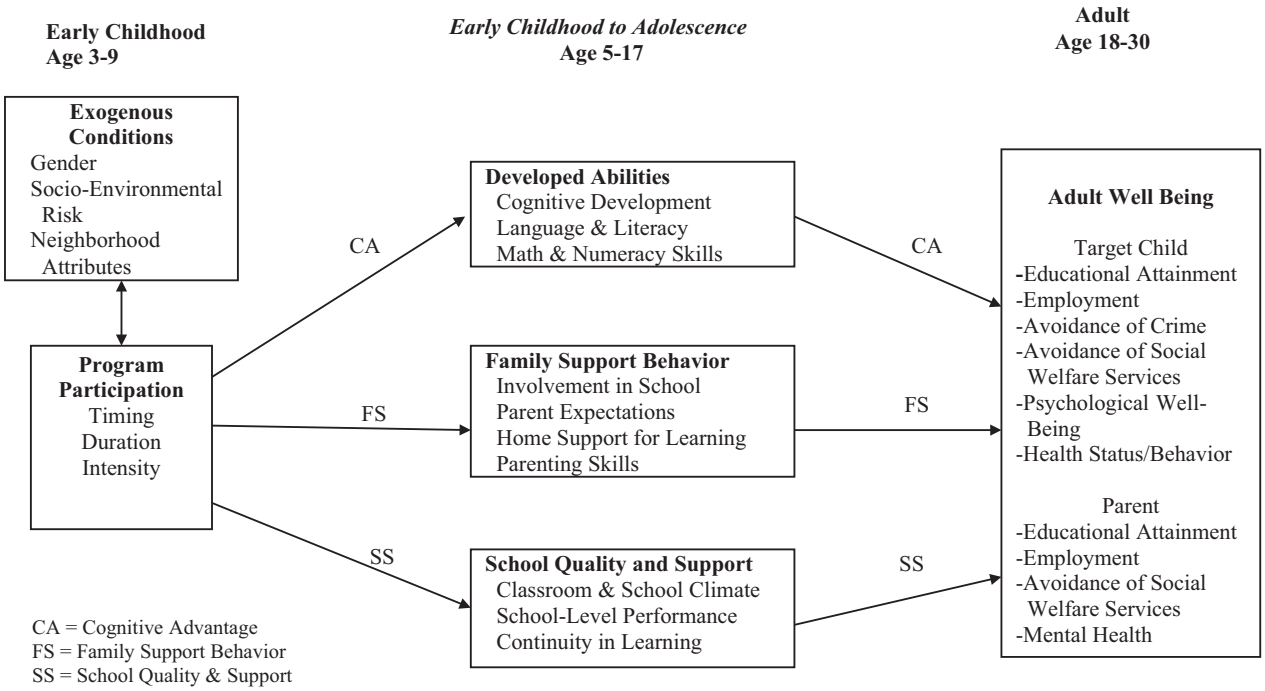

Figure 1. Three processes from early childhood intervention to adult well-being. Adapted from 5-hypothesis model of intervention (5HM, Reynolds, 2012); motivational advantage (MA) and social adjustment (SA) also contribute to impacts (see Appendix).

avoiding the need for remediation. The cumulative benefits of CA was a key finding of the landmark multisite Cornell Consortium for Longitudinal Studies (1983), in which participants in 11 ECI programs experienced increases in cognitive and school readiness skills by half a standard deviation (half a year gain over controls). This culminated in reduced remedial education and higher rates of school completion. Findings from the Abecedarian Project, HighScope/Perry Preschool, and CPC consistently show that participation is associated with CA and achievement (Campbell et al., 2002; Reynolds, 2012; Schweinhart et al., 2005). CA is also supported by ECI meta-analyses documenting mid- to long-term effects on achievement, socioemotional learning, and delinquency (Camilli et al., 2010; Washington State Institute for Public Policy [WSIPP], 2014).

In sum, graduates of high-quality ECIs tend to exhibit CA relative to nonparticipating peers. Upon school entry, they are more cognitively prepared, motivated, and confident in their ability to succeed. CA thus initiates a process of scholastic achievement and commitment, which has in turn been linked to well-being in other domains across the life span. For example, children with greater CA upon school entry have been found to exhibit higher levels of social competence and lower rates of problem behaviors, and are more likely to obtain high school diplomas, college degrees, and steady employment as adults (Power et al., 2013). Thus, the research in this area has increasingly affirmed that "doing well" in school is strongly predictive of "being well"—psychologically, physically, and financially—in both childhood and adulthood (Figure 1).

Family Support Behavior

The FS process indicates that longer term effects of ECI will occur to the extent that participation enhances parenting skills, attitudes, and expectations, and involvement in children's education (Ou & Reynolds, 2010; Reynolds, Ou, & Topitzes, 2004). The main factors examined are parent involvement in school, parent expectations for achievement, and support for learning at home. Parenting behaviors lead to improved well-being (e.g., achievement) by increasing children's learning time directly (reading with parents, higher school attendance) or indirectly (parental monitoring), enhancing children's motivation and school commitment, and increasing expectations for attainment and success. They also improve social support and parenting skills, which reduce social isolation and the risk of child maltreatment. Meta-analyses of family interventions and parenting behaviors (Farrington & Welsh, 2007; Jeynes, 2007) show that involvement and monitoring link to higher achievement and delinquency prevention.

Previous CPC research supports the critical role of FS—and especially parent involvement—in promoting children's academic success and long-term well-being. Using longitudinal CPC data, Hayakawa, Englund, Warner-Richter, and Reynolds (2013) reported that parent involvement influenced continued achievement via two major pathways. First, early parent involvement predicted later parent involvement, such that parents who were highly involved in kindergarten were likely to continue their high levels of involvement throughout the elementary grades. Second, parent involvement in school influenced children's school motivation, which in turn impacted achievement. These results suggest that parents' sustained involvement across the elementary years initiates a cumulative process that continues to foster children's motivation and subsequent parent involvement, which both influence school achievement.

Further evidence on the importance of FS in fostering well-being comes from home visiting and parenting interventions, including Nurse–Family Partnership, Family Check-Up, and Parents as Teachers (Avellar & Supplee, 2013). In a large-scale Parents as Teachers study, Zigler, Pfannenstiel, and Seitz (2008) found that significant improvements in third-grade achievement for a state sample were initiated by parental home literacy and school readiness skills, both of which were further impacted by preschool participation. This suggests the reinforcing influences of FS and CA. Other parenting and home visiting programs generally support these findings (Avellar & Supplee, 2013; Sweet & Appelbaum, 2004), though mixed effects are also reported. The strongest impacts occur for high-need families at relatively high levels of dosage.

In another CPC study, FS, as measured by parent involvement in school and avoidance of later child maltreatment, was found to mediate the effects of preschool on educational attainment, crime, and health behaviors (Reynolds & Ou, 2011). Increased parent involvement in school led to greater school commitment and student achievement, which in turn reduced the incidence of child maltreatment. The generalizability of these results is supported by research from three different ECIs, each of which identified parent involvement as a contributing path from ECI to educational attainment (Abecedarian, Perry, CPC; Englund, White, Reynolds, Schweinhart, & Campbell, 2014).

School Quality and Support

In this process, intervention effects are expected to persist as a function of attending schools of sufficient quality and enrichment. Key indicators of SS include aggregate achievement, student school stability, and school climate (Bogard & Takanishi, 2005; Kyriakides et al., 2013; Reynolds et al., 2004). SS provides the developmental continuity necessary to sustain preschool gains by increasing the duration, predictability, and stability of enriching postprogram learning environments. Families are likely to value and seek out schools that match the quality and climate of children's preschool program (Reynolds, 2012). ECI gains are more sustained in the presence of this learning environment (Campbell et al., 2002; Englund et al., 2014; Reynolds, Magnuson, & Ou, 2010). Evidence indicates that attendance in schools with relatively high percentages of proficient achievers positively affects school climate, performance expectations, and peer norms (Jennings & Greenberg, 2009; Kyriakides et al., 2013; Pianta, 2005). School mobility, especially if frequent, creates learning discontinuities that hinders the maintenance of a positive and predictable environment (Takanishi & Kauerz, 2008). These discontinuities can be reduced and counteracted by ECI (Bogard & Takanishi, 2005; Reynolds, 2012).

Previous studies have indicated that the benefits of Head Start participation are more strongly sustained if participants attend more supportive and higher quality elementary schools (Currie & Thomas, 2000; Lee & Loeb, 1995; Redden et al., 2001). These results parallel studies showing that enhanced elementary-grade services (e.g., smaller classes and greater instructional time) add to and sustain the benefits of earlier intervention (Finn, Suriani, & Achilles, 2010; Mashburn, 2015; Reynolds, Magnuson, et al., 2010). These links have also been corroborated in the findings for children attending CPCs. For example, continued enrollment in higher quality schools mediates the relation between participation and school achievement and attainment (Reynolds, Englund, et al., 2010; Reynolds & Ou, 2011).

School mobility is a negative indicator of the continuity in learning environments that has been frequently associated with lower school performance and higher levels of school dropout and behavioral problems (Han, 2014; Reynolds, Chen, & Herbers, 2009). Recent studies have found that school mobility is associated with adjustment and mental health difficulties (Gruman, Harachi, Abbott, Catalano, & Fleming, 2008), because it may break social ties that increases the risk of later problem behaviors.

Most prior studies indicate that frequent mobility is associated with lower school achievement and problem behaviors, and this impact holds after many individual and family differences are taken into account. Participation in high-quality preschool promotes school stability and support (Bogard & Takanishi, 2005; Englund et al., 2014; Schweinhart et al., 2005), which helps maintain learning gains. Mobility has also been found to mediate preschool effects on early adult well-being (Englund et al., 2014; Reynolds et al., 2009; Reynolds, Englund, et al., 2010), as school-stable children are more likely to remain in better schools, as well as avoid remediation and delinquency.

In the next section, we describe the background and impacts of the CPC program and other ECIs that promote the three processes of influences. This is followed by a breakdown of the magnitude of the influence of the processes in accounting for effects on long-term well-being.

Effects of CPC Intervention

The CPC program opened in 1967 with funding from Title I of the Elementary and Secondary Education Act to counteract the negative effects of poverty on school success. The 25 CPCs were located in the highest poverty neighborhoods in Chicago, in which 7 in 10 families are low income. Common problems were high rates of absenteeism and low achievement.

As the second oldest federally funded preschool program, CPC provides comprehensive educational and family support services to children within a developmentally appropriate ecological framework (Reynolds, 2012; Sullivan, 1971). The program is implemented in centers that are directed by a *head teacher*; a *parent-resource teacher*, who manages the parent-resource room; and a *school-community representative* to connect families with health and social services. Core program principles include a school-based structure, a strong emphasis on literacy, the use of child-focused instructional approaches, and strengthening the family–school relationship. To maximize individual learning opportunities, preschool class sizes are small (average teacher to child ratio is 2 to 17). Comprehensive parent involvement included a variety of home- and school-based approaches. Services are provided from preschool to third grade.

Research on CPC effectiveness is based on many cohorts of graduates and a diverse set of studies, including the Chicago Longitudinal Study (2005). The CLS is an ongoing prospective study of a complete cohort of 989 children who attended 20 CPCs, as well as a matched comparison group of 550 same-age children who attended publicly funded full-day kindergarten in five randomly selected schools. The groups were equivalent on child and family characteristics, and many analyses assessing robustness (e.g., propensity score and latent variable approaches) support internal validity (Reynolds & Ou, 2011; Reynolds, Temple, Ou, Arteaga, & White, 2011). Over 90% of the groups have been followed successfully from kindergarten to adulthood. Evidence from CPC studies meet the rigorous standards of the What Works Clearinghouse and many other registries of effectiveness (Reynolds & Temple, 2008; Reynolds, Temple, Ou, et al., 2011).

The performance of CPC preschool participants consistently exceeded that of the comparison group on many indicators of well-being, from the beginning of kindergarten through early adulthood. Although effect sizes (ES) varied by outcome, most exceeded .20 *SD*, which translate to substantial social benefits (see Appendix S1). For example, the program's initial effect on cognitive skills (ES = .63 *SD*) at age 5 contributed to a cumulative advantage on later well-being. Program-related reductions in special education placement (ES = −.45 *SD*) and grade retention (ES = −.37 *SD*) as well as lower rates of delinquency and crime are indicative of significant economic benefits. For example, by age 24 the preschool group had a 22% lower rate of felony arrest than the comparison group (16.5% vs. 21.1%, respectively). The educational and crime prevention benefits also carry over to mental health, as CPC graduates had lower rates of depressive symptoms in early adulthood (12.8% vs. 17.4%; ES = .20 *SD* or a 26% reduction). Beneficial effects were not detected for classroom adjustment, perceived competence, or overall college attendance (Ou & Reynolds, 2010; Reynolds, 2012).

Effects of Other ECIs

Although there is a large literature on the effects of ECIs, only a few studies have tracked participants into adulthood. We highlight studies examining the effects of five programs on school achievement, educational attainment, and crime prevention. They illustrate the three processes of long-term effects. Findings from the Abecedarian Project, Perry Preschool, and the Cornell Consortium show ES on school achievement ranging from one third to three fourths of a standard deviation. These are consistent with the ES of CPC and state prekindergarten programs (Camilli et al., 2010). A similar pattern of findings was found for high school completion and years of education (Reynolds & Temple, 2008). Perry Preschool, a panel study of Head Start (Garces, Currie, & Thomas, 2002), and Nurse–Family Partnership (Eckenrode et al., 2010) also found reductions in criminal behavior of 30%–40%, which also match those from CPC. This latter effect is largely attributable to reductions in child maltreatment. Reductions in health compromising behavior and mental health problems have also been observed (Englund et al., 2014; O'Connell et al., 2009; Ou & Reynolds, 2010). Overall, these findings show that high-quality ECIs enhance participants' well-being across a range of contexts and over time. Some shorter term studies (e.g., Early Head Start, Head Start) have found few gains (O'Connell et al., 2009), which may be a function of dosage, fidelity, attrition, and levels of family and school support (Reynolds, Temple, Ou, et al., 2011).

Summary of Processes of Influence

We summarize the contributions of the three processes of CPC and related programs for four youth and adult outcomes using the percentage contribution of each process to the total indirect (mediated) effect (see Appendices S2–S4; Reynolds & Ou, 2011). The findings are based on structural equation modeling of longitudinal associations in which measurement error, multiple indicators of each process, and alternative specifications are taken into account. After adjusting for gender, family risk, and the influence of other processes, CA-initiated pathways involving early achievement and need for remedial education accounted for 19%–40% of the indirect effect. These are sizable contributions, both direct and indirect, in good-fitting models. FS-initiated pathways, which included parent involvement in school and avoidance of child maltreatment, independently accounted for 18%–26% of the indirect effects. SS paths, measured by school quality and frequent mobility, accounted for 27%–50% of the indirect effect of preschool (see Appendices S5 and S6). Domain crossover was evident as FS and SS accounted for sizable shares of impacts on arrests. Impacts on felony arrest were mediated by the number of school moves alone (*b*s = −.13 [program to moves] and .09 [moves to arrest]) and by

paths involving parent involvement, school mobility, and high school completion (Appendices S3 and S6). CA and SS accounted for substantial shares of impacts to adult depressive symptoms.

With regard to depressive symptoms, the majority of the indirect effect of CPC was attributable to paths initiated and contributed by CA, FS, and SS. CA showed the largest contribution. Similar to the other outcomes, one process was that the early CA advantage (b = .36) carried over to promote greater parent involvement (b = .19) and attendance in higher quality schools (b = .24), which lowered rates of delinquency (b = −.12) and improved the likelihood of school completion (b = .18), leading to lower rates of depressive symptoms (Appendix S6). SS was the largest contributor to juvenile arrest, whereas the three processes made equal contributions to high school completion and felony arrest.

A similar pattern of findings has been found for school achievement and occupational attainment. Studies have also used structural equation modeling to strengthen validity. Reanalyses of the Perry, Abecedarian, and CPC programs (Englund et al., 2014; Reynolds, Englund, et al., 2010), which included matched measures and sequences of each process, revealed that the processes accounted for a majority of the observed impacts on educational attainment and health behaviors at age 21 (see also Appendix S7). The studies also showed that classroom SA helped transmit the effects of CA. CA contributed more to long-term effects for Perry and Abecedarian, whereas FS and SS influences were larger for CPC. In both Perry and CPC, the number of school moves was predicted by program participation (bs = −.11 and −.17) and directly linked to juvenile arrest (bs = .20 and .12, respectively). Many studies also show that the sustainability of effects in ECI and prevention programs is strengthened by SS (Jennings & Greenberg, 2009; Mashburn, 2015; Redden et al., 2001).

Feasibility and Cost Effectiveness at a Larger Scale

Our review of the three processes shows their positive direct and indirect contributions to many indicators of well-being. These provide a strong foundation for expanding effective ECIs that target these processes. For example, because FS is an established influence on children's outcomes, a variety of interventions (e.g., center-based, family-based) are being expanded as two-generational approaches (Avellar & Supplee, 2013). The No Child Left Behind Act also mandates that schools develop parent involvement and engagement plans. Parallel efforts to improve school quality through curricular reforms, increased alignment of instruction, and small classes also are feasible and scalable. Expanding access to effective programs can provide cumulative advantages, which lead to enhanced well-being in multiple domains.

ECIs that operate by promoting CA, FS, and SS also show high economic returns (O'Connell et al., 2009). Table 1 shows the results of cost–benefit analyses for three programs: Abecedarian, Perry, and CPC. Although studies vary dramatically in cost per child and in age of measurement, each program demonstrates a positive economic return with regard to cost savings in remediation and increases in economic well-being due to higher levels of education. Abecedarian showed a return of roughly 3 dollars per dollar invested, CPC 7–11 dollars, and Perry 9–16 dollars (Barnett & Masse, 2007; Reynolds & Temple, 2008; Reynolds, Temple, White, Ou, & Robertson, 2011; Schweinhart et al., 2005). The

Table 1
Benefit–Cost Findings of Selected Early Childhood Interventions (2012 Dollars)

Program	Program scale	Age at follow-up	Program cost per child ($)	Total benefits to society per child ($)	Benefit–cost ratio
Abecedarian project	Model	21	53,495	172,988	3.23
Chicago CPC Preschool-1	Large	21	9,426	67,271	7.14
Chicago CPC Preschool-2		26	9,426	102,117	10.83
Perry Preschool-1	Model	27	20,221	176,740	8.74
Perry Preschool-2		40	20,221	326,407	16.14
WSIPP (2014) meta-analysis	Large	4–17	6,974	29,210	4.20

Values were converted for the original studies to 2012 dollars using the Consumer Price Index for Urban Workers (CPI-U). Studies were as follows: Abecedarian (Barnett & Masse, 2007), Child–Parent Center (CPC; Reynolds et al., 2002; Reynolds, Temple, White, et al., 2011), and Perry (Schweinhart et al., 2005). Washington State Institute for Public Policy (WSIPP) meta-analysis included 49 studies of state and school district programs.

benefits were also spread among many outcome domains.

A meta-analysis of 49 state and school districts programs (WSIPP, 2014), primarily for children from economically disadvantaged contexts, shows a projected return of roughly four dollars per dollar invested, in large part because of early enrichments in cognitive and scholastic development, parent involvement, and socioemotional learning. This indicates that implementation at larger scales can provide sizable economic benefits provided that program quality is relatively high. As shown in Table 1, the cost per child to achieve positive returns is lower than that of model programs.

Generalizability Across Child, Family, and Community Contexts

The CPC program has been recently expanded to serve children from diverse ethnic backgrounds (e.g., Latinos, Hmong refugees) and other understudied groups. With funding from the U.S. Department of Education's Office of Innovation, the Midwest CPC Expansion preschool to third-grade intervention is presently located at more than 30 urban and metropolitan schools in Illinois and Minnesota. A cohort of over 2,500 program and 1,300 comparison-group students in four districts is being followed to third grade. The comparison group participated in the usual preschool programs for 3- and 4-year-olds, and attended 25 schools that were matched to program schools on propensity scores of economic disadvantage. School achievement and adjustment, and parent involvement are the primary outcomes of investigation. The six core elements of the program are collaborative leadership, effective learning experiences, aligned curriculum, parent involvement and engagement, professional development, and continuity and stability. They are tailored to the needs of each school and community. The program manual (Reynolds, Hayakawa, Englund, Candee, 2016) describes the CPC implementation system and the larger evidence base (see also Hayakawa et al., 2015; Temple Reynolds, 2015).

Initial findings show that Chicago and Saint Paul implementation in 2012–2013 have effects on school readiness and parent involvement in school that are similar to CPC implemented in the 1980s (Reynolds et al., 2014). This pattern was observed in the presence of a significantly enhanced program in which baseline performance was equivalent and comparison groups received existing school-based preschool (i.e., state preschool or Head Start). For example, full-day compared to part-day preschool in the same schools was linked to higher rates of meeting school readiness norms (81% vs. 59%) at the end of preschool and lower rates of chronic absence (21% vs. 38%; Reynolds et al., 2014). Relative to participants in the usual preschool program, a substantially greater percentage of Chicago CPC participants met school readiness norms at the end of the year (70% vs. 52%; Reynolds et al., 2016). These effects indicate the continued feasibility and effectiveness of the program across contexts. Other high-quality state and local programs show similar patterns of effectiveness (e.g., Camilli et al., 2010; WSIPP, 2014).

It will be important to assess effects on ethnic and geographic subgroups. The original CLS sample was nearly all African American. Although this sample was representative of urban poverty, it does not reflect other types of contexts. The CPC program generally exerts its strongest effects on boys and children affected by the highest levels of sociodemographic risk (Ou & Reynolds, 2010; Reynolds, Temple, White et al., 2011). Girls benefit more from school-age intervention (Reynolds, Temple, Ou, et al., 2011; Reynolds, Temple, White, et al., 2011). Impacts of extended intervention are similar for most groups.

Limitations of Knowledge

Although the processes substantially explained impacts on well-being, three limitations should be noted. First, studies primarily examined educational outcomes. Only a few have examined mental health, crime, and health behaviors. Individual processes may play different roles depending on the outcome and age of measurement. Further research is warranted.

Second, few studies have examined several processes together within a comprehensive model. The contributions of each process may vary by individual indicators and across programs and social contexts. Social and motivational factors, for example, may play significant yet complex roles. More extensive longitudinal studies into adulthood are needed. Although distinct, the processes are correlated and should be interpreted within the full model specification and program theory. Findings from life course studies show the relative strength of the three processes. Alternative processes across a wide range of studies also warrant greater attention.

Finally, the three processes reviewed in our article have not been fully assessed for particular child and family subgroups, such as family economic status, different racial and ethnic groups, and for different levels of risk. The magnitude of influence for each will depend on the level of variation observed, which will be affected by child and family risk factors. However, the accumulated research in human development and health sciences (Braveman & Gottlieb, 2014; O'Connell et al., 2009) is consistent with the findings of our review.

Conclusion

Strengthening programs and sustaining their effects are key contributions of processes. Given the importance of entering kindergarten and the early grades proficient in multiple domains, it is expected that improving the quality of programs and increasing their length and intensity will strengthen the paths to well-being. Program features such as well-trained teachers and small classes are key sources of impacts and economic benefits (Table 1). The provision of comprehensive services can broaden the paths of influence necessary for sustained effects. Our review supports the generalizability of the processes in promoting well-being. A range of interventions that impact these processes would be expected to positively contribute. These could be independent or complementary of ECI. For example, interventions that prevent child maltreatment may exert longer term effects on health and well-being by impacting juvenile delinquency, school achievement, and need for remedial education. The processes reviewed can promote sustained effects of intervention. Their reproducibility in a variety of contexts will help ensure that the demonstrated benefits of ECI can be effectively scaled.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Appendix S1. Effects of Preschool Participation in the Child–Parent Centers (CPC)

Appendix S2. Percentage Contributions of Three Processes to Total Indirect Effects of CPC Preschool Participation

Appendix S3. Percentage Contributions of Paths of Influence to Standardized Total Indirect Effects of CPC Preschool

Appendix S4. Percentage Contributions of Mediators to Standardized Direct (Main) Effects of Preschool

Appendix S5. LISREL Mediation Model for High School Completion Coefficients Are Standardized and Adjusted for Measurement Errors

Appendix S6. LISREL Mediation Model for (a) Felony Arrest and (b) Depressive Symptoms By Age 24. Coefficients Are Standardized and Adjusted for Measurement Errors

Appendix S7. Summary Paths of Effects From Preschool to Years of Education at Age 21 in Three Studies.