Children from low-income families who got intensive education early in life treat others with high levels of fairness in midlife, more than 40 years later, even when being fair comes at a high personal cost,
according to a new study published today in *Nature Communications*.

The 78 people in the study were followed as part of the Abecedarian Project, begun in the 1970s and to this day one of the longest running randomized controlled studies of the effects of early childhood education in low-income and high-risk families.

Participants played games designed to measure their adherence to social norms and their social decision-making processes. In one game, a player was asked to split a sum of money - $20 - with another participant. The participant could either accept the amount proposed, or reject it, in which case neither received any money. When faced with unequal offers, participants had to make trade-offs between self-interest and the enforcement of social norms of equality.

This is where the value of early childhood education became apparent. Players who, in the 1970s, had been given intensive educational training including cognitive and social stimulation when they were young children, strongly rejected unequal division of money among players when they were in midlife, even if it meant they would miss out on hefty financial gains themselves.

"When someone rejects an offer, they are sending a very strong signal to the other player about the decision regarding how the money should be divided," said Université de Montréal assistant psychology professor Sébastien Hétu, a first-author of the study. "People who received educational training through the Abecedarian Project were inclined to accept generally equal offers, but would reject disadvantageous and advantageous offers. In effect, they punished transgressions that they judged to be outside of the social norm of equality."

Originally developed and led by Craig Ramey, a professor and distinguished research scholar at the Virginia Tech Carilion Research
Institute, the Abecedarian Project investigates the impacts of intensive early childhood educational interventions on language and learning in disadvantaged children. The new research involves an international group of scientists led by Virginia Tech neuroscientist Read Montague, in whose laboratory Hétu was a postdoctoral associate before coming to Montreal.

Using computational modeling, the study's researchers also discovered differences in social decision-making strategies between participants. For example, in another game, players who had received educational interventions early in life planned further into the future than people who didn't.

"The participants who received early educational interventions were very sensitive to inequality, whether it was to their advantage or their disadvantage," said Yi Luo, first author of the study and a postdoctoral associate in Montague's lab. "Our results also suggest that they placed more value on the long-term benefits of promoting social norms as opposed to short-term benefits for personal gain."

She concluded: "Our research shows that investment in early childhood education, especially in the education of highly vulnerable children from low-income families, can produce long-term effects in decision-making even decades after the educational experience."
