R&D Item

1. Clarification of functional requirements and social acceptability of CCC2.0

Progress until FY2025

1. Outline of the project

In this research and development area, we aim to clarify the requirements, principles, and social acceptability involved in building social capital. Previous studies have suggested that social capital may be associated with well-being; however, it is not necessarily effective for every individual in the same way. In addition, the kinds of social connections needed may differ from person to person.

Accordingly, this research area seeks to clarify such individual differences by utilizing large-scale longitudinal datasets that track the same individuals over time. Through this approach, we aim to identify what kinds of social connections are needed for different individuals and how those connections contribute to well-being, thereby establishing the requirements and principles of CCC.

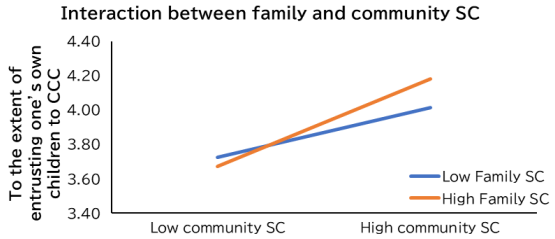
2. Outcome so far

Task 11: Extracting the Requirements for CCC 2.0 Based on Regional and Family Characteristics

To empirically identify the conditions necessary for CCC, we examined how willingness to participate in CCC is associated with social capital at both the community and family levels. Using survey data from 3,200 parents with children under the age of nine, we found that residing in a community with high levels of community social capital increased willingness to entrust one's own children to a CCC-like system, and that this effect was relatively stronger among families with high levels of family social capital, reflected in positive parent-child relationships (upper-right figure).

Task 12: Identifying the Requirements of Social Capital That Influence Children's Mental and Physical Well-Being

We conducted secondary analyses and additional research using large-scale cohort data from the Japan Environment and Children's Study (JECS), a nationwide survey on children's health and the environment.



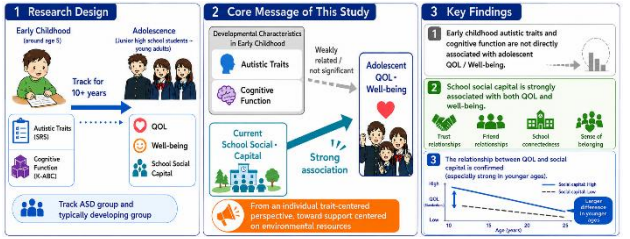
Through these studies, participants were classified into groups based on levels of social capital from the prenatal period until children reached 2.5 years of age, and these groups were associated with the developmental outcome at 5.5 years of age, suggesting that both the quality and continuity of social support influence children's development.

Task 13: Identifying and Implementing the Requirements for Robots That Support Children's Social Capital

We developed foundational technologies for measuring children's social networks and worked on the development of both a UFO-shaped robot designed to approach target children and a synchronizing robot intended to promote children's social connections. For this, we conducted a questionnaire survey with 22 childcare professionals who had an average of 17 years of experience. This preliminary investigation examined the characteristics of target children as well as effective approaches for engaging with them (see figure below). Based on these findings, the hardware design phase was completed, and the project advanced to the physical prototyping stage.

Task 14a: Identifying the Requirements of Social Capital That Enable Social Adaptation

Using longitudinal data that enabled tracking participants for more than 10 years from early childhood, we found that quality of life (QoL) and well-being during adolescence were more strongly associated with current social capital than with developmental characteristics observed in early childhood. Furthermore, the association between social capital and well-being was also observed among children with special needs.



In addition, in a study involving elementary school children, we confirmed that engaging in rhythmic synchronization activities with friends increased levels of the hormone oxytocin. Based on these findings, we proposed a mechanism underlying the formation of social capital during childhood.

Task 14b: CCC 2.0-Based Interventions for Promoting Social Adaptation

We conceived and implemented a mobile outreach concept called the "Art Delivery Car" (see right figure). Through activities conducted at cultural facilities, temporary housing sites, and other locations, we promoted the formation of continuous points of contact with local communities.

3. Future plans

We will continue clarifying what kinds of social capital are needed for individuals with different personal characteristics, while compiling the requirements and principles of CCC into a set of guidelines.