Press Release
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Tailor-Made Support for Children in Households Receiving Public Assistance: Establishing a Novel Method Toward Developing an Effective Support System

Summary

Poverty adversely affects children's health and social lives. Children in households receiving public assistance often have diverse health and lifestyle needs that require individualized support tailored to their specific living backgrounds. Moreover, effective support methods vary depending on each child's circumstances.

To address this issue, a research team led by Keiko Ueno, an assistant professor in the Department of Social Epidemiology at Kyoto University Graduate School of Medicine, utilized responses from a questionnaire survey of 1,275 children. Using a machine learning technique called soft clustering, they categorized the children into small groups (segments) based on differences in their living backgrounds. The researchers then conducted interviews with professionals (including NPO staff, child psychiatrists, public health nurses, and school counselors; hereafter referred to as “experts”) to understand each segment’s lifestyle characteristics and collect opinions on suitable health and life support strategies. As a result, five distinct and expert-validated segments were identified: “Children who can do things on their own (Segment 1),” “Children living in a facility (Segment 2),” “Children who are in *hikikomori* (social withdrawal) (Segment 3)," “Children who cannot be bothered to answer conceptual questions about themselves (Segment 4)," “Children from households with intergenerational public assistance use (Segment 5)." From the expert interviews, diverse support strategies were suggested, addressing not only physical health but also social and mental well-being: “Financial support for higher education (Segment 1),” “Support for experiencing diverse and enriching pleasures together (Segment 2),” “Presence of non-family adults for continuous interaction (Segment 3),” “Support to help them think about themselves together (Segment 4),”” Whole family support (Segment 5).”Based on these findings, the team is now developing a tailor-made support system that presents support plans matched to each segment.

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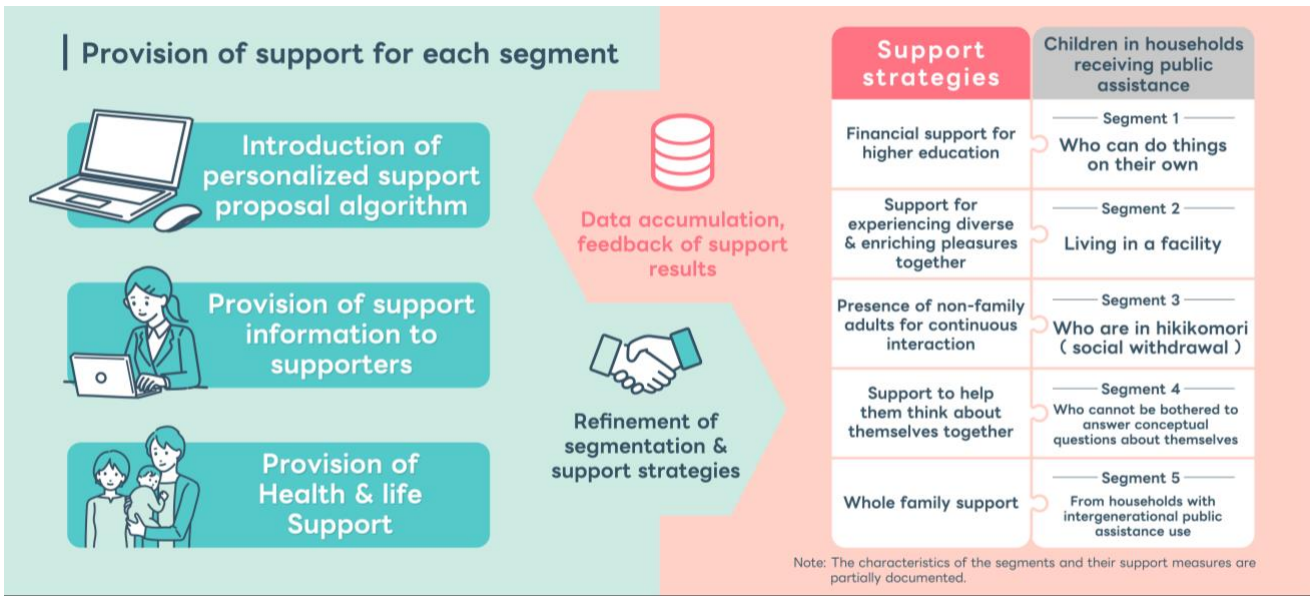

1. Background

Poverty has a negative impact on children's health and social well-being. Children receiving public assistance face various challenges, and personalized support is essential. Social marketing—a strategy that uses marketing principles to address social issues—has been recognized as effective in this context. One of its key components is segmentation, the process of dividing a population into subgroups based on specific attributes to provide more targeted and effective interventions.

This study aimed to classify children from public assistance households into distinct segments using a machine learning approach (soft clustering). Furthermore, the team conducted expert interviews to better understand each segment's background and characteristics and propose appropriate support measures.

2. Methods and Findings

The study adopted an explanatory sequential design of mixed methods research (see Glossary).

First, to segment children based on their living environments, the team used data from a questionnaire survey answered by 1,275 children aged 10–15. This included information on living conditions, lifestyle habits, health, study habits, and school life. The method applied was Probabilistic Latent Semantic Analysis (PLSA), a soft clustering technique. Next, semi-structured interviews with seven experts and one focus group with three experts were conducted to gain qualitative insights into each segment's background and characteristics and to gather views on suitable support strategies.

Ultimately, five distinct segments were identified through PLSA, which experts agreed upon. These were the same five segments listed earlier. Additionally, the qualitative analysis suggested diverse support strategies that address not only physical health but also social and mental health needs.

Note: The questionnaire data used in this study were obtained from a Ministry of Health, Labour and Welfare-funded project in 2018 surveying 1,972 children aged 10–18 in households receiving public assistance.

3. Impact and Future Plans

This study enabled us to identify the profiles and appropriate support strategies for children in households receiving public assistance, based on quantitative analysis results obtained through machine learning and expert input.

Since 2021, the “Health Management Support Program for Public Assistance Recipients" has been implemented as a mandatory initiative at welfare offices across Japan, aiming to support the health and daily lives of public assistance recipients. However, the program primarily targets recipients aged 40 and older, making it difficult for children in households receiving public assistance to be included. As a result, they often do not receive adequate health and lifestyle support. To address this gap, we are currently developing a tailor-made support system that identifies children in need of support and proposes support plans tailored to their specific living backgrounds, categorized by segment.

We will plan to enhance the precision of our segmentation by conducting analyses using larger datasets, refining the segmentation methodology based on the findings of this study, and reclassifying the segments using actual outcomes from implemented support strategies.

4. About the Research Project

This study was conducted with support from the following organizations: Japan Science and Technology Agency (JST), RISTEX program: “Co-Creation for the Achievement of the SDGs – Preventing Social Isolation and Building Diverse Social Networks" Project name: Hybrid Care Network Like a "Anywhere Door" Co-Created with the Community (Project No. JPMJRX21K6), and Japan Society for the Promotion of Science (JSPS) Grants-in-Aid for Scientific Research (Project No. 17K19793, 20K20774, 22K21081, 23K16326)

<Glossary of Terms>

Mixed Methods Research

A research design that combines quantitative and qualitative data collection, analysis, and integration to provide a deeper understanding of the research question.

Soft Clustering

A method that allows data to belong to multiple clusters simultaneously, with probabilities indicating the degree of belonging. PLSA is one such method.

Probabilistic Latent Semantic Analysis (PLSA)

Originally developed for document classification, this technique compresses high-dimensional data into lower dimensions to identify latent topics (clusters). When applied to numerical data, it estimates the probability of both individuals and variables belonging to specific clusters.

Semi-Structured Interview

An interview method using predefined questions with the flexibility to ask follow-up questions based on the respondent’s answers.

Focus Group

A qualitative method involving small-group discussions to gather diverse opinions and experiences on a specific topic.

<Researcher’s Comment>

The approach of verifying machine learning-derived segments through expert interviews was unprecedented and highly challenging. Building on this achievement, we aim to develop and promote tailor-made support systems for all generations receiving public assistance—not just children.

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