

Support from Birth: ZEPPELIN 0-3 and first follow-up ZEPPELIN 5-8

ZEPPELIN¹ is one of the largest longitudinal intervention studies in Europe with a randomized controlled trial study design: Using the Parents as Teachers (PAT) program, parent educators made home visits to support young children in 132 families with social burdens every 2 to 3 weeks from birth to age three. The children are being compared to young children in 116 families who are not receiving PAT program support. The aim is to test whether early support from birth is effective in families that are in difficult circumstances.

The main research questions are:

1. Does the early support have positive impacts on the children's development?
2. Do the parents show improved parenting practices?
3. Do the families become more socially integrated?
4. Do children receiving support from the PAT program have greater school success than children not receiving PAT?

At present (February 2020) the results of the first three years of the study and more recently of the first two years of the follow-up are available, currently with the children aged 4 to 6 years (1st & 2nd year of kindergarten). Data collection in the 1st grade has started recently, first results are expected by the end of 2020. After that, all families will be visited again at home (2nd grade) and all children (whole classes) in the 3rd grade will be examined (2021/22).

The first three questions can be answered positively in terms of proven effectiveness (see below). The fourth question - i.e. whether early support increases educational opportunities in the longer term - can only be answered after the evaluation of the results from the third primary school year in 2021/22, and later on in the transition to lower secondary education in 2023-2025.

Target group: ZEPPELIN is interested in families that are in difficult circumstances around the child's birth and that need support with early care and education of their children. 'Difficult circumstances' means that the families have burdens and risk factors that make the start of parenthood difficult, such as limited social support, financial distress, unemployment, or family difficulties. Here are some data from the sample: Of the 248 participating families, 73% of mothers do not have Swiss citizenship, 31% spoke no or little German at recruitment, 34% completed no schooling beyond compulsory education, and 12% are single parents. Fourteen percent of the children were born prematurely (the Swiss average is 7.3%), 10.6% were born weighing less than 2,500 grams (the Swiss average is 5.9% for Swiss nationals and 6.3% for foreign nationals), and 5.2% are twins (the Swiss average is 1.9%). The socioeconomic status of the ZEPPELIN sample is very low, with a mean score of 24 on the International Socio-Economic Index of Occupational Status (ISEI), which is half the mean score in the Program for International Student Assessment (PISA). Families could be recruited thanks to good cooperation with the regional child and youth services centers (kjz), mainly with the parent advisors but also with the pediatricians.

Early support: Early support by the PAT program was implemented in several communes in the Canton of Zurich (near the project locations Dietikon/Schlieren, Opfikon/Kloten, and Dübendorf/Uster). The families received at-home support from a qualified and experienced parent educator, in some cases starting before the birth of the child and in most cases starting shortly after the birth of the child, continuing up to the child's third birthday. In addition, group meetings were held monthly at the family center. All PAT parent educators completed training in how to implement PAT and had regular coaching and supervision. For information on the necessary prerequisites and conditions for PAT, see <http://www.pat-mitellernlernen.org>.

¹ *Zürcher Equity Präventionsprojekt Elternbeteiligung und Integration* [Zurich Equity Prevention Project with Parents' Participation and Integration]

Research: To examine the effectiveness of the early support, the families were randomly assigned to two groups: an intervention group receiving the PAT program and a control group with no intervention. Comparison of the two groups aims to uncover possible impacts of the early support. For that purpose, after the birth of the child and around the time of the child's first three birthdays, measurements were conducted at three levels: parents, child, and parent-child interaction.

A) Main Results at Project End ZEPPELIN 0-3²

Sample: Of 248 families, 38 families were lost to attrition by the fourth measurement time point (child age 3 years) due to moving away, lack of time, illness, or unreported reasons. The loss of participants was thus less than 5% per year and smaller than in comparable studies with PAT conducted in the United States or Germany.

Child's development: The greatest impacts were found in the children's language, cognition, and behavior (Bayley-III, SBE-KT, CBCL). Children receiving PAT support showed significant advances compared to children in the control group; they possessed a larger vocabulary and could express themselves better. They were less anxious and slept better through the night (health questionnaire). Experiments conducted on delayed gratification showed that children receiving PAT support had better impulse control.

Parenting practices: The analyses indicated that the positive impacts were mainly associated with a more stimulating environment at home (HOME). Already after one year, mothers receiving PAT were significantly more sensitive with their children (CARE-Index) than mothers not receiving PAT. Moreover, the increased sensitivity was identified to mediate the intervention effects on language development.

Social integration:

Parents receiving PAT support had better connections with community resources (Soziale Netzwerke). For instance, they utilized toy lending libraries as well as libraries significantly more frequently than families in the control group. Further, mothers receiving PAT support felt more supported by their partners than mothers in the control group did.

Outputs: ZEPPELIN has already been presented at several national and international conferences. Twelve Master's theses and three doctoral dissertations have been completed. A selection of peer-reviewed publications:

- Lanfranchi, A. & Neuhauser, A. (2013). ZEPPELIN 0-3: Theoretische Grundlagen, Konzept und Implementation des frühkindlichen Förderprogramms „PAT –Mit Eltern Lernen“. *Frühe Bildung*, 2 (1), 3-11
- Lanfranchi, A. (2014). Frühkindliche selektive Prävention bei Kindern aus Familien in Risikosituationen - Stigmatisierungsgefahren und Entwicklungschancen. *Familiendynamik*, 39(3), 188-199
- Neuhauser, A., Ramseier, E., Schaub, S., Burkhardt, S. C. A., Templer, F., & Lanfranchi, A. (2015). Hard to reach families – a methodological approach for early detection, recruitment, and randomization in an intervention study. *Mental Health and Prevention*, 3, 79-88. doi: 10.1016/j.mhp.2015.07.002
- Hubmann, P., Gardini, E., Neuhauser, A., Burkhardt, S. C. A., Schaub, S., Lanfranchi, A., Turecki, Gustavo, Ehlert, U. (2016). Early intervention moderating the effect of maternal sensitivity on FKBP5 methylation in children living in psychosocially disadvantaged families. *Psychoneuroendocrinology*, 71(S), 60. doi: 10.1016/j.psyneuen.2016.07.157
- Jungmann, T., Sierau, S., Dähne, V., Serbati, S., Dugravier, R., & Lanfranchi, A. (2017). Effectiveness of four early intervention programs in Europe: How do the results inform program development and dissemination? *Nursing and Health Sciences*, 3(3), online: <http://www.rroij.com/open-access/effectiveness-of-four-early-intervention-programs-in-europe-how-do-the-results-inform-program-development-and-dissemination-.php?aid=86357>
- Neuhauser, A. (2018). Predictors of maternal sensitivity in at-risk families. *Early Child Development and Care*, 188(2), 126-142. doi:10.1080/03004430.2016.1207065
- Neuhauser, A., Ramseier, E., Schaub, S., Burkhardt, S. C. A., & Lanfranchi, A. (2018). The Mediating Role of Maternal Sensitivity: Enhancing Language Development in At-Risk Families. *Infant Mental Health Journal*, 39(5), 522-536. doi:10.1002/imhj.21738
- Schaub, S., Ramseier, E., Neuhauser, A., Burkhardt, S. C. A., & Lanfranchi, A. (2019). Effects of Home-Based Early Intervention on Child Outcomes: A Randomized Controlled Trial of Parents as Teachers in Switzerland. *Early Childhood Research Quarterly*, 48, 173-185 doi: 10.1016/j.ecresq.2019.03.007
- Gardini, E., Schaub, S., Neuhauser, A., Ramseier, E., Villiger, A., Ehlert, U., Lanfranchi, A., Turecki, G. (submitted). NR3C1 Methylation is Associated with Early Life Stress and the "Parents As Teachers" Intervention in Children aged 3 years.

² For all analyses, we checked whether the impacts found are not erroneously attributable to the variables child's gender, child's birthweight, mother's ability to speak German, and family burdens.

B) Main Results follow-up 2017 (ZEPPELIN 5-8): t₅ and t₆

Sample: Due to move away, lack of time and no interest there were a total of 87 drop-outs by the end of 2019 (N=219 by t₆). The sample loss is now 35% for 6 study years. Participation in ZEPPELIN remains high by international comparison.

Child development: The positive effects of PAT found at the end of the project at the age of 3 years can be proven again at the age of 5 and 6 years with regard the **language skills** of the children ("Sprachgewandt"). In other instruments, too, there are overall beneficial values for the children of the IG (e.g. **less problem behaviour** in CBCL, **better impulse control** in the experiments). In the 6-year-olds of the IG, the kindergarten teachers signal **less emotional problems**. Positive effects in the 6-year-olds are mainly in **mathematical skills** (WILMA), but not in cognition (SON-R).

Parenting practices: The positive findings in the area of **home stimulation** (HOME) proven at the age of 3 years also show up at the age of 5 and 6 years: Parents of the IG offer their children a more conducive learning environment than parents from the KG; their parenting behaviour (APQ) is also more positive. Contrary to expectations, mothers of the IG agreed more with the powerful enforcement and expressed less agreement with their partner on educational issues.

Key Data of the ZEPPELIN Intervention Study

- Longitudinal study (2011 to 2016) with follow-ups (2017 to 2020, 2021-2026, 2027-2028, 2032 to 2034)
- Target group: Families with social burdens and with a newborn child
- Main aim: Early support for enhanced educational opportunities in the long term
- Intervention: Parent education at home using the Parents as Teachers (PAT) program
- RCT design; N at t₀ (baseline) = 248 families with 261 children (intervention group = 132 families; control group = 116 families)
- 7 measurement time points so far: t₀: (3rd month of life), t₁ (1st year of life), t₂ (2nd year of life), t₃ (3rd year of life), t₅ (5th year of life; 1st Kindergarten), t₆ (6th year of life; 2nd kindergarten)

Support Program: Parents as Teachers (PAT)

- A parent advisor with special training (PAT parent educator) makes regular at-home visits to 12 families (every 2 to 3 weeks for 3 years)
- Group meetings are held once a month at the family center
- The building of social connections in the local community is intensively pursued
- PAT parent educators conduct development screenings
- At program end, utilization of further resources is set up

Conclusion for practice

The prevention program Parents as Teachers (PAT) is especially well suited for providing effective and long-lasting developmental support to children in families with social burdens.

The challenge is correctly identifying families at risk and obtaining and retaining their willingness to participate in the intensive program.

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