

FAMILY AND ENVIRONMENTAL FACTORS INFLUENCING CHILD DEVELOPMENT

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ABSTRACT

Long-term studies have provided evidence that child development potential is influenced not only by genetic factors but also by various family, home, and broader contextual environmental factors. The aim of the theoretical review is to identify the most significant socioeconomic factors of the environment/family environment that can negatively affect early child development, predicting lower school readiness, school performance, and lower academic achievements. The theoretical review sought answers to the following questions: which socioeconomic environmental factors, family factors influence the early child's developmental potential, and what is their relationship with the child's academic achievements? How are socioeconomic/family risks identified? The theoretical study determine several main groups of factors that can predict high family risks and hinder and negatively impact early child development. The results were used to construct the part of the screening instrument developed by University of Latvia researchers in cooperation with University of Liepaja and Riga Stradiņš University researchers. The instrument – Early Childhood Development Screening Toolkit (In Latvian: *Bērnu agrinās attīstības skrīninga instrumentu komplekts – BAASIK*).

Keywords: *early child development, environment, family factors, socioeconomic factors, preschool.*

Introduction

Long-term studies have provided evidence that the child's developmental potential is influenced not only by genetic factors but also by various family, home, and broader contextual environmental factors. So called socioeconomic (SES) factors within the family environment, in interaction with genetic factors, can negatively impact child development, leading to lower school readiness and academic achievement. Theoretical literature often mentions parental socioeconomic status as risks that can diminish the child's potential for achieving higher academic outcomes (Jimerson et al., 1999, Sirin, 2005). The child's academic achievements are influenced not only by the family's socioeconomic status but also by the conditions and functioning of the family. Li and Qiu (2018) found out that two pathways through which family influences children's academic

performance – better educational opportunities lead to better academic performance and parenting behaviour and educational support for their children could cultivate children's learning habits and affect academic performance.

Current paper was developed during the project “Preparatory Research for the Development of a Methodological Toolset for Assessing Early Childhood Development Needs”. The project was implemented based on the agreement between Latvia's state, Interdepartmental Coordination Centre and University of Latvia, No. 4.1-1/18-2021 in the period: November 25, 2021 – September 30, 2022. Objective of the project: Develop and test a screening method (SM) that is in line with modern scientific achievements and suitable for better psychological/pedagogical/medical assessment practices worldwide. The screening method consists of a set of multiple instruments (BAASIK – in Latvian) (for parents, child, preschool teacher, and physician) and is intended for children aged 1.5 to 6 years. In the first stage there was a task to develop a theoretical framework for developmental disorders based on integrated information from the latest scientific literature and disease classification systems such as DSM-5, ICD-10/11, and ICF for children aged 1 to 6 years. As part of the theoretical framework in order to include in the screening (BAASIK- in Latvian) Parent Survey was planned to include so-called the socio-demographic section, where the respondents – parents had to provide information about their socio-demographic status.

Thus the theoretical review sought answers to the following questions:

- Which socioeconomic environmental factors, family factors influence the child's developmental potential, and what is their relationship with the child's academic achievements?
- How are socioeconomic/family risks identified?

Methodology

Review of theoretical literature was used as a systematic way to collect, analyse and synthesizing previous research. It was used qualitative, integrative approach (Toracco, 2005). The approach was chosen as there is growing research on the topic that was chosen and there was a clear need for new review. Review of theoretical literature with the aim of identifying the main socio-demographic, family environment and educational environment influencing factors of the child's development potential was used. Therefore the aim of the research was not to cover all the literature on the specific problem, the author included in the review articles of the entire spectrum both recently published literature and literature of previous years. The articles from databases (Scopus, Web of Science) were examined. There were the key-words used while searching in the databases: *socioeconomic factors, family factors, family environment, preschool children, achievement, and early child development*. Specifically there were searched for Meta studies and longitudinal studies.

Thus the paper will delve into these issues, first exploring the relationship between the influence of family factors and the child's academic achievements, then seeks to find

out what are the means to identify family related risks, finally make conclusions and propose the groups of family factors that should be known when developing the Sociodemographic Information and Family Environment Block of the Screening Parent Survey in (BAASIK- in Latvian).

Theoretical background

The relation between the influence of SES, family factors and the child's academic achievements

The relation between SES factors and child academic achievement has been acknowledged by several Meta analyses. Sirin (Sirin, 2005) conducted a meta-analysis of researches carried out from 1990 to 2000. The aim was to determine the impact of socioeconomic status on student achievement. The conclusions confirmed previous findings (a similar study was conducted in 1982), indicating that there are correlations between socioeconomic status and academic achievement in the majority of the evaluated studies. Korous et al. (2022) analyzed 14 meta-analyses published between 1982 and 2019, which indicating that SES is a meaningful contributor to the development of cognitive ability and achievement. Selvitopu & Kaya (2021) conducted a Meta-analytic study of the effect of SES on academic performance. 48 independent studies were analyzed that included 62 different samples, and the total sample was 386.601. Findings revealed that the relation between SES and academic performance represented a moderate positive correlation. Letourneau et al. (2013) conducted a meta-analysis to research the relationship between SES and developmental outcomes for children and adolescents between the ages of birth to 19 years of age. The results revealed very small to small, but significant effects of SES on aspects of the three outcome variables of literacy and language, aggression, and internalizing behaviours including depression. Peverill et al. (2021) in their Meta analyses among 26,715 participants aged 3–19 years, found that children raised in families with low socioeconomic status (SES) are more likely to exhibit symptoms of psychopathology, however, it is likely to vary in different populations of children and in different communities.

Children living in poverty are at a higher risk of developmental and behavioural problems compared to their peers from higher-income families. These differences can be observed even at a very young age (de Paiva et al., 2010). Research by Fernald et al. (2013) revealed differences in early language proficiency among infants from advantaged and disadvantaged families. Significant disparities in vocabulary and language processing efficiency were already evident at 18 months between infants from higher- and lower-SES families, and by 24 months there was a 6-month gap between SES groups in processing skills critical to language development. In the research by Lawson et al. (2018) relation between childhood SES and executive function (EF), that refers to the cognitive processes, supported by prefrontal cortex, that regulate goal-directed behaviour, has been established.

At the same time, research in so-called underdeveloped countries, showing that there is a relation between SES and student achievement, however it is overall weak (Kim et al., 2019).

This indicates that in so called developed countries, where there is social stratification, these issues of inequality are much more relevant, according to which SES has a stronger influence on children's development opportunities.

The studies examine both SES factors and broader sociodemographic or family factors relation to child development. In a study conducted in the United States, the authors examined the relationship between family factors and children's school readiness, as well as their academic achievement at the age of 4 (literacy skills, mathematical abilities, behaviour, socio-emotional skills). They found that so-called family factors or risks predicted lower school readiness among children. The study included both socio-demographic risks (family income, parental divorce, single-parent households, race/ethnicity, minority status) and family process risks (low parental involvement, limited cognitive stimulation, parental mental health aspects, specifically maternal depression symptoms, and parental harshness associated with child punishment and less frequent parent-child interactions) (Pratt et al., 2016). Often, these risks are interconnected, for example, if parents have low income, they may not have the means to afford stimulating toys, materials, and books. The role of mothers in relation to child's development and achievement has been examined for some time. It was acknowledged, for example, that maternal employment can effect negatively child's development (Brooks-Gunn et al., 2010). It is important the time mothers spend with their babies and the most important – the quality of the time spent together. It was concluded that maternal interaction quality with a child (her physical and mental availability) has impact to later child's cognitive outcomes, including reading comprehension skills (Taylor et al., 2008). In the research by Caputi et al. (2017) was concluded that mother-child relationship at age 5 correlate with children's academic achievement at age 9, controlling for early background and verbal abilities. In Meta analyses conducted by Madigan et al. (2019) about parenting behaviour (i.e., sensitive responsiveness or warmth) and child language, was revealed, that the association between parents sensitive responsiveness and child language was statistically higher than that of warmth and child language, the effect sizes were stronger in low and diverse SES groups compared with middle to upper SES groups.

In Australia, in 2014, a study (Heath et al., 2014) was conducted in which the prereading and reading skills of 102 four-year-old children (46 girls and 56 boys) were assessed several times- before the pre-literacy period, then, at the ages of five, six, and seven, their reading skills were evaluated again. The study found that children from families with high risk factors (low socioeconomic status, history of language difficulties, and parental phonological awareness difficulties) had lower reading proficiency indicators. The study by Chiu et al. (2015) on the relationship between family social capital and their children's reading proficiency revealed that social capital has a direct impact on both the child's reading motivation and reading behaviour. In analysing the theoretical literature, Ha (2021) concluded that not only the socioeconomic status of families but also positive parental involvement in early and primary school education influences the development of reading skills. Studies indicate that family income and parental education level are

directly related to beliefs about parental roles and parental involvement in education (Tekin, 2011).

Park et al. (2017) conducted a longitudinal study that assessed the academic performance of 914 children from preschool age, focusing on the aspect of school culture and three types of parental involvement (direct involvement in improving school life, involvement in their child's educational development, and communication and networking with other parents). The results of the study confirmed a relationship between parental involvement (direct involvement in improving the overall school experience, such as volunteering, fundraising, project work, and networking with other parents) and students' achievements in mathematics and reading. Importantly, these students from the participating schools showed higher average results compared to other schools. The study also concluded that parental networking, in particular, was beneficial for children from lower socioeconomic status families, as parental involvement reduced the negative impact of socioeconomic factors.

The longitudinal study conducted in Australia (Hood et al., 2008) revealed that parental involvement in their children's education during the preschool years had a positive impact on the development of children's reading skills, particularly in expanding their vocabulary and overall reading proficiency. Niklas and Schneider (2013) emphasize that for the comprehensive development of children's reading and writing skills, not only letter knowledge, phonological awareness, vocabulary, and cognitive abilities are important but also several social aspects such as family SES, whether the child comes from a family with migration experience, and the "home literacy environment." The authors focused on the "home literacy environment" and its influence on children's reading development. The home literacy environment is characterized by the literacy resources available in the family and the interactions within the family that support the child's linguistic development and promote reading skills, as it is closely related to the child's language development (Niklas et al., 2020). The results of the longitudinal study (Niklas & Schneider, 2013) showed that the home literacy environment plays a significant influential role, particularly in the growth of children's vocabulary and overall reading proficiency. Moreover, it partially mitigates the negative impact of other factors such as socioeconomic status and migration background. The home literacy environment is a good predictor of children's academic performance in reading and mathematics (Niklas & Schneider, 2017). Shared reading with children has a positive impact not only on their linguistic development but also on socio-emotional learning (Wirth, 2020). The study conducted in the United States (Barnes & Puccioni, 2017) examined both the qualitative aspect of shared book reading (the depth of discussions parents engaged in with their children regarding the content) and the quantitative aspect (how much reading occurred). Researchers concluded that the quality of shared reading is directly associated with better mathematical performance in children, while the quantity of reading is related to improved reading skills. Parental involvement and stimulating children through educational activities positively affect both their readiness for preschool and later academic achievement (King et al., 2020).

However, with the introduction of technology into the home environment, it may have an influence on children's achievements. So far, studies have not found a connection between the digital home literacy environment and children's language and reading development (Segers & Kleemans, 2021), but further research is needed in this area.

Similarly, the association between the home environment promoting mathematical skills and children's mathematical and spatial skill development, as well as later performance in mathematics, has been evaluated. Some studies indicate a relationship, while others do not confirm it (Purpura et al., 2020). The home environment promoting mathematical skills includes both direct and indirect training of children's mathematical skills. Direct training includes activities that explicitly teach mathematical concepts, such as counting. Indirect training refers to a broader everyday experience that indirectly teaches and helps acquire mathematical skills (e.g., comparing sizes, measuring, discussing money). Additionally, skills related to spatial experience activation are emphasized, including the perception of various spatial objects and their placement in space (e.g., drawing maps, measuring objects, building, solving puzzles), as well as the development of geometric prerequisites. In a replicative study (Purpura et al., 2020), it was found that only direct training, supplemented with indirect training of mathematical skills within the family, significantly predicted a child's performance in calculation and higher-level mathematical skills. In Germany (Anders et al., 2013), a study was conducted revealing that socioeconomic factors play a significant role and have an impact on the development of children's mathematical skills from ages 3 to 7. At the same time, the study demonstrated that the activities of preschool institutions can positively influence children's mathematical skill development in such cases.

Another significant factor related to the family environment that can negatively impact a child's development is elevated family stress. Studies have established a connection between increased family stress and a child's performance in pre-school, specifically in terms of reading skills, mathematical skills, letter recognition, and numeral recognition (Bramlett et al., 2000), as well as their behaviour. McEwen (2000) describes the allostatic model of chronic stress developed in 1998, which explains how an organism reacts to stress to regain homeostasis, highlighting the "cost" the organism pays to recover from stress and what happens in the brain and body when "engaging" and subsequently "disengaging" from a stressful situation. The long-term effects of chronic stress, also known as toxic stress (when negative and adverse events persist in a person's life), are described as negative and can affect both physical and mental functioning. Even in very young children, prenatal and postnatal stress, including prolonged separation (180 minutes) from the mother during the early stages of life, can influence their stress hormone levels later in life in various situations. Importantly, the experiences children undergo in early childhood directly impact their later life outcomes. Traumatic events in childhood (emotional, physical, or sexual abuse, neglect) can affect the development of cognitive impairments in later stages of life and lead to other problems such as aggressive behaviour, depression, increased risk of suicide, and substance abuse. McEwen (2017) points out that adverse early life experiences interact with specific gene alleles, resulting

in long-lasting effects on the brain and body through epigenetic mechanisms. However, there is hope in research that demonstrates the possibility of developing and implementing preventive and supportive programs that promote interactions between the child's brain and body through therapeutic techniques and interactions, aiding the child in recovering their psychoemotional equilibrium, thanks to the plasticity of the child's brain. Although this is one of the factors predicting children's academic achievement, the impact of these factors cannot be solely attributed to educational institutions (Bramlett et al., 2000), as these interactions primarily involve therapeutic approaches.

The quality of parenting, including parental skills and parenting style, also plays a significant role in influencing a child's developmental potential. It acts as an important mediator between sociodemographic risk factors and child developmental outcomes, particularly in the areas of cognition, language, and speech (Burchinal et al., 2008). Both parenting style and skills, as well as changes in them even during infancy, can predict a child's cognitive abilities (Burchinal et al., 2008).

In the context of importance of experiences in the early years of life in creating the bases for the child's future the importance of early childhood education in children's development has been emphasized in research. Research concludes that children who attend preschool achieve higher outcomes in school compared to those who do not attend preschool (Sheehan et al., 1991), and their achievements are higher in both mathematics and literacy (Weiland & Yoshikawa, 2013). Furthermore, studies show that the duration of preschool attendance, whether half-day or full-day, does not significantly affect students' performance (Gullo & Clements, 1984). Children who attend preschool demonstrate better results in mathematics, such as counting, recognizing and distinguishing geometric shapes, compared to those who do not attend preschool (Aslan & Arnas, 2015). If a child attends preschool, even as early as three years old, it predicts higher math achievement in fourth grade (Santin & Sicilia, 2018). A study conducted in the United States found that pre-writing/pre-math skills in preschool are strong predictors of higher achievement in third grade for all students, including those from low socioeconomic status and ethnically diverse families. All students who attended preschool showed higher results in both reading and mathematics in third grade (Manfra et al., 2017). The greatest benefits of preschool attendance are observed in children from socioeconomically disadvantaged families (Zhang, 2017, Duncan & Magnuson, 2013, van Huizen & Plantenga 2018). Preschool programs in short run improve children's school readiness, their pre-academic skills, in long run, however results are not always straight forwarded – effects children's later life chances, improving educational attainment and earnings and, in some cases, reducing criminal activity (Duncan & Magnuson, 2013). Preschool education is significant for all children, more precisely qualitative preschool education (van Huizen & Plantenga 2018), but it is particularly essential for children from low socioeconomic status families as it provides an opportunity to mitigate negative socioeconomic family risks.

How is it possible to identify family environment-related risks?

To evaluate the family environment and potential risks, it is believed that the best approach to use as a method is through interviews and direct observation. This requires special training (Gledhill & Garralda, 2005). However, there are questionnaires that can be filled out by parents themselves, although these questionnaires may not always be stable and reliable from a psychometric perspective. The authors (Gledhill & Garralda, 2005) mention two assessment questionnaires that parents can complete: the McMaster Family Assessment Device and the Global Family Environment Scale. In the McMaster Family Assessment Device, parents rate each statement on a 4-point scale: ‘strongly agree,’ ‘agree,’ ‘disagree,’ and ‘strongly disagree.’ If parents agree with 24 or more statements (out of 30), the family is considered to have poor or unhealthy functioning. The Global Family Environment Scale is user-friendly and requires minimal training. It assigns a score from 1 to 90 according to established guidelines.

Another assessment tool is screening, which can help identify social factors that may negatively impact a child’s development and well-being. Screenings should be used over an extended period of time (longitudinally) to assess progress repeatedly. The interpretation of screening results should involve a professional team, and the risk of stigmatization should be avoided by correctly interpreting the screening outcomes. Screenings should evaluate both general known risks (such as poverty) and specific risks that are less common but still significantly impact a child’s development, such as risks related to violence (Chung et al., 2016). One of the most popular screening instruments developed in the United States in the 1970s to assess the home environment is called the “Home Observation for Measurement of the Environment” (HOME) screening (Bradley, 1993). Its updated version is still widely used in various parts of the world (Liang, 2019). It assesses demographic indicators of the child (age, gender, academic performance), parents (mother’s age, education, ethnicity, father’s age, education, ethnicity), family structure (divorced, intact), and marital satisfaction (yes or no). The home environment is evaluated through multiple aspects, and the term “caregiver” is used in the screening, encompassing the idea that caregivers can be parents, grandparents, foster parents, or other individuals who have taken primary responsibility for the child’s care. Each statement is divided into several subscales: daily routine; stimulating active growth; positive emotional behaviour; environmental variety; caregiver involvement in school activities; caregiver engagement, interpersonal and communication stimuli.

Discussion

Parents’ socioeconomic status (SES), which is typically characterized by parental income level, employment, educational level, can be a risk factor that reduces or limits a child’s developmental potential and affects their chances of success in preschool and school. It is important to note that a child’s achievements are influenced not only by the family’s socioeconomic status but also by the family’s life and functioning conditions, which can change in one direction or another throughout the child’s life. The impact

of these factors remains significant throughout all the child's developmental periods throughout preschool and school, and there is theoretical and empirical evidence to support this claim. Evidence from research suggest that the importance of socioeconomic factors that influence children achievement remains important throughout years globally, since 1990 these relations have strengthened (Liu et al., 2022). At the same time it show that in developed countries there are more educational inequalities, which creating a new challenge for developing countries as they expand school access (Kim et al., 2019). Trends that are globally characterized by educational expansion that focuses on increasing educational opportunities does not seem to reduce inequalities in academic outcomes between high- and low-SES school children in educational system (Liu et al., 2022).

Identifying early family risk factors (preferably from birth) that may negatively impact children's academic achievements is one way to provide timely and targeted support to families. This can involve offering specific interventions and support programs that serve as preventive measures. These interventions can be implemented within families themselves, in preschool educational institutions, or through a combination of both settings, as well as outside the family, such as in preschools, support services, or centres. It would be wise to focus interventions on family and community factors that contribute to child's developmental outcomes across the socioeconomic spectrum. One significant factor is the attendance of preschool educational institutions, which can mitigate the negative socioeconomic risks faced by families.

Studies indicate that a single socioeconomic factor in the family environment does not always influence a child's academic difficulties. Instead, multiple factors in various combinations affect a child's academic achievements in preschool and later in school (Evans et al., 2013). Those can be combination of several factors, for example preterm-born children with low SES (Potijk et al., 2013).

Protective factors, which mitigate the negative effects of these factors, have also been analysed in research. For example, close emotional relationships between mother/parents and children, targeted involvement of educational institutions or caregivers in promoting a child's development, can reduce the risks associated with poverty and negative impacts on a child's development (Burchinal et al., 2008). However, it should be acknowledged that it is not always possible to assess SES and family environmental risks at an individual level theoretically and empirically to accurately predict their impact on an individual child's developmental potential. Nevertheless, research clearly shows that the more of these risks, which can form various combinations, exist, the greater the likelihood that they will have a negative impact on a child's development.

Conclusion

In conclusion, there have been identified the most significant factors that have the potential to impact a child's early development – some factors can have negative effects on children's development, for example, low family income or mother work, however they can be balanced by significantly positive indirect effects, for example early

preschool attendance. Screening is one of the means of early identification of negative factor impacts on child development. Therefore, in a parental survey (in Latvian version BAASIK) using a screening instrument, it would be advisable to identify several groups of key factors or constructs (see Table 1) that can predict high family risks and hinder child development.

Table 1 Family factor groups that should be explored when developing a screening parent questionnaire on socio-demographic information and family environment block

Factors	Description	Source
Socioeconomic/ sociodemographic factors include: <ul style="list-style-type: none"> • Income level/ employment; • Family status; • Migration experience; • Parental education level. 	Poverty risk (lack of income, dependence on benefits, low-income status, unemployed parents), single-parent family, single earner, child being raised by a single parent/caretaker. Migration experience. Risk related to parental education level (possible education levels: completed primary school, incomplete secondary school, completed secondary school, incomplete higher education, completed higher education at the bachelor's or professional level, master's degree, doctorate).	(Sirin, 2005; Niklas & Schneider, 2013, Chiu et al., 2015, Pratt et al., 2016, Chung et al., 2016 Purpura, 2020, Fernald et al., 2013)
History of family/ parents include: <ul style="list-style-type: none"> • History of illness in the family; • First-degree relative who has experienced difficulties with language, reading skills, or mathematics. 	Mental disorders in the family history (a specific diagnosis or difficulties with language, reading/writing, parents' phonological awareness difficulties, parents' mental health problems) have been present in a first-degree relative who has experienced difficulties with language, reading skills, or mathematics.	(Pratt et al., 2016, Chung et al., 2016)
Child stimulation/ involvement at home include: <ul style="list-style-type: none"> • A stimulating home environment; • Promoting reading skills; • Creating a literacy-enhancing home environment; • Promoting foundational math skills; • Quality interaction with child; • Enhancement of child experience by visiting museums, library, etc. 	Parental competence and skill in interacting with the child from early childhood, purposefully doing something together every day (playing, etc.), creating meaningful interactions, being responsive, engaging in emotionally responsive interactions. There are stimulating toys available at home, engaging in art activities at home, going on excursions, walks, trips, visiting museums, cultural events with parents. Parents' reading habits (how often they read), establishing reading habits together with the child – how often parents read, the quality of reading time together. Reading in front of the child, reading together with the children. Visiting the library, the number of books at home. Parents directly encourage counting objects together (big and small), indirectly encourage measuring different volumes, components, and talking about money.	(Pratt et al., 2016, King et al., 2020) Niklas, Schneider, 2013, Niklas et al., 2020, Purpura et al., 2020, Taylor et al., 2008)

Factors	Description	Source
Parent involvement in education process and preschool include: <ul style="list-style-type: none"> • Direct involvement; • Indirect involvement; • Parents networking with other parents 	Direct parental involvement in improving preschool life (such as participation in parent councils, etc.). Parents engage in preschool activities, support all kinds of preschool/school activities (such as attending events). Parents, together with their child, complete assigned homework, activities, project work in education. Parents actively communicate with other parents and teachers, building networks, for example, to discuss children's progress, how to better complete homework, and what additional activities can be done at home to promote child development. They meet with other parents, network.	(Hood et al., 2008, Park et al., 2017, Henderson & Mapp, 2002, Pratt et al., 2016)
Family stress involve: <ul style="list-style-type: none"> • Postnatal stress; • Parental stress; • Violence in family. 	Perinatal, as well as postnatal stress, including prolonged separation, increased parental stress, prolonged traumatic situations, violence (emotional, physical, sexual, neglect).	(Bramlett et al., 2000, McEwen, 2017, Pratt et al., 2016, Chung et al., 2016).
Parent child interactions and parenting style involve: <ul style="list-style-type: none"> • Availability; • emotional availability; • Warm relationships. 	The parenting style used by parents – neglectful or authoritarian style, which involves neglecting the child or using punishment, having little emotionally warm relationship with the child, and limited interaction between the child and parents. For mother there is not enough to be just present, emotional availability is very important factor. Mother and child relations.	(Pratt et al., 2016, Burchinal et al., 2008, Sorce & Emde, 1981, Caputi et al., 2017, Madigan et al., 2019)
Attending preschool and quality of preschool programs involve: <ul style="list-style-type: none"> • Early preschool attendance; • Preschool attendance. 	Attending a preschool education institution (private or public). Early initiation of preschool education.	(Aslan & Arnas, 2015, Zhang, 2017, Miller et al., 2017, Santin & Sicilia, 2018, Duncan & Magnuson, 2013, van Huizen & Plantenga 2018)

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