

Towards family-friendly conferences~~in the geosciences~~: results from a first survey in the geosciences

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Abstract. ~~In the geoscientific field, building~~ Building an academic career requires a high level of dedication to research, frequent publishing, and maintaining visibility within the academic community. ~~Conferences~~ Scientific conferences are the central platforms for networking and knowledge exchange, making them keystones ~~for a scientific of an academic~~ career. However, the early stages of an academic career often coincide with family planning considerations. Many young researchers
5 face the challenge of balancing professional responsibilities with family obligations. A balancing act that becomes particularly difficult during non-routine work events such as conferences. Such occasions tend to pose significant organizational challenges for families. As mothers still ~~perform most caregiving~~ provide most of the care, they are disproportionately affected. This conflict is an important factor ~~inhibiting the rise~~ contributing to the “leaky pipeline” by inhibiting the progression of women through ~~the academic career ladder. Hence, increasing the family-friendliness of conferences holds a chance of diversifying~~
10 ~~the academic ranks. Increasing the family-friendliness of conferences has the potential to diversity the scientific~~ community, allowing more ~~women parents~~ to participate, while reducing the tension ~~of the academic work-family conflict~~ between academic work and family obligations.

~~In this work~~ Here, we present the results ~~from of~~ an online survey among researchers ~~from in~~ the geoscientific field, primarily based in Europe. The required support of parents at scientific conferences is analyzed and the acceptance ~~of researchers without~~
15 ~~children~~ for the implementation of new support offers by researchers without children is examined. Our key findings are that (1) parents wish for more support at conferences, (2) the majority of non-parents welcome family-friendly measures, and (3) conference organizers can accomplish a lot in this respect, even with small adjustments. The responses we received from parents paint a qualitative picture of measures that can be ~~taken~~ considered to create a family-friendly conference experience, ranging from ~~an increase of~~ increased transparency and awareness for the challenges of parents to tangible offers ~~like~~ such as
20 childcare and financial funding. ~~This feedback invites conference organizers to join the conversation about family support and shows that new measures have great support in the geoscientific community.~~ support. Our findings are distilled into guidelines for conference organizers, allowing them to better address the work-family conflict and transform their conferences towards more equity, diversity, and inclusion.

1 Introduction

25 Participation in scientific workshops and conferences is essential for academic growth and offers opportunities for knowledge exchange, skill development, and professional networking. For early-career researchers, these events play a vital role in establishing their presence within the scientific community, refining presentation techniques, and ~~initiating collaborations~~deepening their understanding of their field of study. Networking at conferences facilitates ~~connections~~the connection with potential employers, initiates future collaborations, and supports ~~securing the securement of~~ research funding. According to Hauss (2020),
30 young researchers emphasize that conferences strengthen professional networks and increase publication opportunities, while ~~they~~ also foster a sense of visibility and identity as a scientist.

However, not all researchers profit from these opportunities equally. For example, multiple studies show that participation in conference discussions is dominated by senior men (Lefebvre and Bernhard, 2024; Jarvis et al., 2022; Gulland, 2022). Despite progress in gender equity, women remain underrepresented in science, technology, engineering, and mathematics (STEM), particularly in postdoctoral positions and beyond (Vieira do Nascimento et al., 2021). This “leaky pipeline” leads to shortcomings in science and scientific outcomes as gender-diverse teams are known to produce better research (Nielsen et al., 2017). The underrepresentation of women is closely linked to the structural challenges they face within the academic environment (Welde and Laursen, 2022). This encompasses an incompatibility of care responsibilities with scientific work. Balancing academic careers with family responsibilities is especially challenging for young parents, with women often bearing a disproportionate share of caregiving
40 duties (Cattaneo et al., 2019). Studies ~~have shown~~show that work-life balance constraints can limit career advancement for women in STEM (Thoman et al., 2022; Ceci and Williams, 2011; Baker, 2010). For instance, Thoman et al. (2022), who interviewed women in STEM fields from the southwestern United States, found that 80% face ~~a the~~ choice between delaying or forgoing parenthood or reducing their workload, e.g., by opting for less ambitious career paths. This is consistent with findings ~~from of~~ Ceci and Williams (2011) and Baker (2010), which underscore the higher likelihood of women to seek part-time or
45 flexible roles to achieve work-family balance. ~~In this work, the terms caregiver and parent are used interchangeably to refer to a person that is responsible for the well-being and upbringing of a child~~Furthermore, female early career researchers in Germany name the incompatibility of work and family life as the main reason to consider not continuing their doctorate (BuWiK, 2025).

~~The timing of family planning often~~The work-family balance becomes especially challenging during what has been described as the “rush hour of life”, a period where family planning coincides with critical career stages .In STEM(Buber et al., 2021). In
50 Europe, the average age for earning a PhD is approximately varies between 30 years (Statistisches Bundesamt, 2021a; National Center for Science and Education Statistics (NCSES), 2021b) and 38 years depending on the country (European University Institute, 2018), while the average age of a woman at the birth of her first child is 29.8 years in 2023 (European Commission, Eurostat, 2022). To our knowledge, the age of first-time parents in Europe is 29.7 years for women and 33.2 years for men (European Commission, Eurostat, 2022; Statistisches Bundesamt, 2021b)
fathers is not consistently recorded for all of Europe. Data from Germany suggest that first-time fathers are up to three years
55 older than mothers with 33.2 years (Statistisches Bundesamt, 2021b). We find a similar picture in the US, with a median age at phd graduation of 30.7 years for recipients (30.2 years for female and 31 years for male recipients) in the field of geosciences, atmospheric and ocean sciences in 2021 (National Center for Science and Engineering Statistics (NCSES), 2021b). In the

U.S., US, first-time parents tend to be slightly younger compared to Europe, with women giving birth to their first child at 27.3 years (National Center for Health Statistics, 2025). These overlapping timelines create unique challenges for early-career researchers who are parents, particularly when it comes to conference participation. Without adequate support, caregivers are often excluded from these crucial networking and professional development opportunities. Callaghan (2016) observed that women with dependent children are significantly less likely to present at conferences. 27.5 years in 2023 (National Center for Health Statistics, 2025).

~~Although the work-family~~ The timing conflict between the early stages of a scientific career and parenthood can influence the decision of young scientists about having children. 11.5% of female and 17.7% of male doctorate recipients in the US are parents in the geosciences, atmospheric, and ocean sciences (National Center for Science and Engineering Statistics (NCSES), 2021b). In Germany, 18% of female and 16% of male doctoral students in all disciplines have children. Doctoral students in natural sciences form the smallest group of parents (7.81% of all women and 9.21% of all men have children) (Brandt et al., 2021). The distribution among professors shows a significant difference between male and female researchers. Here, 76% of all male professors and 59% of all female professors are parents (BuWiK, 2025). In Germany, women with an academic degree are more often childless than other groups (Bundeszentrale für politische Bildung (bpb), 2024). Similarly, the fertility study by Buber et al. (2021) across four European countries shows that traditional role models and temporary contracts significantly influence the intention of highly-educated women between 27 and 40 to have children in the near future. This leads to childlessness being particularly common among female university graduates. BuWiK (2025) reports that 64% of female and 48% of male doctorate recipients name the lack of work-life balance and uncertain career prospects as barriers that leads them to postpone their desire to have children. Also, a study by Sonneveld et al. (2010) among doctoral recipients across four universities in the Netherlands reveals that recipients with children are 3.5 times as likely to leave academia in comparison to those without children.

~~Although the work-family~~ conflict interferes with the scientists' ability to start a family, their desire to have children remains strong. ~~In Germany less than one-third of scientists have children (Metz-Göckel, 2014), but~~ According to a study at multiple higher education institutions in Hamburg, Germany, almost 80% of scientists employed at all stages of their career express a desire to have ~~them~~ children (Gottburgsen et al., 2022). A very similar picture can be seen in the US, where ~~scientists~~ academics have been found to have fewer children than they want when pursuing a scientific career (Ecklund and Lincoln, 2011). However, the discussions about family responsibilities remain scarce within the scientific community ~~-(e.g., Calisi, 2018; Nature Editorial, 2024) with limited available literature. One reason might be that initiating such discussions often falls upon those directly affected, the parents themselves. Those may see this topic as too personal or fear to be perceived as less committed. Etheridge (2025) interviewed 32 academic mothers from the UK and developed the concept of "care obfuscation" that describes how care responsibilities and their impact on academic work are concealed, underestimated or denied by mothers as a response to conflicting pressures and expectations.~~ This discrepancy underscores the need for more open conversations and support for parents in academia.

~~Attending~~ The overlapping timelines of academic career and family planning create unique challenges for early-career researchers who are parents, particularly when it comes to conference participation. Without adequate support, parents are

often excluded from these crucial networking and professional development opportunities. Attending scientific conferences as a parent ~~or caregiver~~ includes navigating logistical, financial, and emotional challenges. ~~Lack of Parents have to decide to~~
95 ~~either bringing their children to the event or organizing childcare at home. Both options potentially require financial resources, since extra hours of childcare might have to be paid, a larger hotel room has to be booked or the partner has to take holidays in order to care for the children. When available, financial support from home institutions for bringing children often involves a complex application process. These organizational efforts are further complicated because conference organizers often provide little or no information about their family policies or support options on their websites, forcing parents to contact them directly.~~
100 ~~The planning that goes into attending a conference requires mental capacity long before the actual event. The barrier is so high that not participating often appears to be the only option. Callaghan (2016) studied the impact of dependent children on the overall research productivity and observed that women with dependent children are significantly less likely to present at conferences. Missing~~ family-friendly policies can limit opportunities for caregivers to participate, which ultimately leads to inequities in academia (Angela L. Bos and Schneider, 2019). Addressing these barriers is critical to advancing equity, diversity,
105 and inclusion (EDI) in STEM fields. Family-friendly policies have been shown to enhance inclusiveness and retention ~~as demonstrated by Singh et al. (2018), who~~ (Singh et al., 2018). Singh et al. (2018) found that organizational efforts to support a work-life balance significantly increase women's attachment to their field and ~~their~~ the likelihood of persisting in their careers.
Additionally, the long-term study by Albanesi et al. (2023) of the labor market in 24 countries worldwide shows that strong childcare support plays an important role for female participation. There is a clear need for family-friendly conferences, since
110 creating such inclusive environments is essential to fostering a more diverse and equitable scientific community (Swann, 2019). ~~Gender-diverse teams are known to produce better science (Nielsen et al., 2017), and family-friendly policies can help ensure broader participation from parents and caregivers. While the geosciences~~ While the scientific community has recognized the importance of such policies (e.g. ~~The Geological Society of America, 2023~~) (e.g. The Geological Society of America, 2023; Jesus-Rydin et al
, data on their prevalence and effectiveness remain limited. This highlights the need for systematic research to identify effective
115 strategies that support caregivers at scientific events.

This study presents findings from an online survey conducted in 2023 ~~as part of a project~~ on family-friendly conferences in the geosciences. ~~They were first presented at the EGU General Assembly 2024 (Päffgen et al., 2024).~~ The survey aimed to explore the challenges faced by parents and caregivers at academic events and to gather insights on potential support systems. Drawing inspiration from Pohl et al. (2022), who developed a checklist for family-friendly conference culture, this survey
120 sought input from scientists with and without children to identify practical measures for conference organizers.

The study addresses the following questions:

- How can parents be supported at scientific conferences?
- What do scientists without children think about family-friendly offers at conferences?
- What actions can conference organizers take to ensure that their event is family-friendly?

125 Based on our findings, we propose guidelines for organizing family-friendly conferences, including a practical checklist that is divided ~~for times~~ into actions that can be taken before, during, and after the event.

This paper is organized as follows: Section 2 describes the structure and design of the survey. The results of our survey are presented in Section 3. Section 4 provides an analysis of the results and introduces guidelines for enhancing family-friendliness at conferences. A detailed checklist for organizers is provided in Appendix A. Additionally, an exemplary assessment of the family support at the European Geoscience Union General Assembly can be found in Appendix B.

2 Methods

~~The~~ The presented online survey focused on potential support systems ~~for increasing the family-friendliness to increase the family-friendliness~~ of scientific conferences. To that end, ideas and opinions from geoscientists with and without children were collected. Our survey design was guided by Pohl et al. (2022), who interviewed participants at a meeting of psychologists about family status, childcare, and support needs. Their survey lead to a checklist for improving family-friendly culture, communication, and logistics at future meetings. Our study expands on the work of Pohl et al. by considering a broader sample that includes international researchers attending a variety of conferences in the geosciences (e.g., EGU GA, American Geophysical Union Annual Meeting, D-A-CH Meteorology Meeting, Ocean Sciences Meeting, Goldschmidt Conference). Consequently, this allows us to create a more comprehensive guide for conference organizers.

The survey was created with the online tool Empirio (2024) and was online and open for participation from 30 June ~~until to~~ 31 October 2023. During that time, it was advertised on several social media platforms such as X and LinkedIn as well as in newsletters of geoscientific institutes and at several international conferences. ~~The~~ Additionally, the survey was distributed via networks of female and early career scientists. The survey was available in English and German. Of the 245 scientists that participated, 101 participants conducted the English and 144 the German version of the survey. The survey contained 22 questions in total: 18 addressed caregivers and 14 non-caregivers. In this work, the terms caregiver and parent are used interchangeably to refer to a person that is responsible for the well-being and upbringing of a child. A complete overview of the questions is given in Tab. C2 in the Appendix C. The first three questions focused on general information on conference participation. Depending on whether a participant stated to have children or not, they were directed to a different set of questions. While scientists with children were asked about their needs and experiences at conferences, scientists without children were asked about their opinion on increasing support for families at conferences (see Fig. 1). In the final part of the survey, both groups were asked demographic questions about their age, gender, and status group (see Tab. C1). Most of the questions were optional. On average it took the participants six minutes to complete the survey.

In the survey, different question formats were applied. The majority of questions were in the single or multiple choice format, giving the participants the opportunity to choose from an array of options. The answers to these questions were used for a quantitative analysis. To investigate the correlation between participants' answers and their gender and parental status (whether they are caregivers or not), we applied the Pearson χ^2 test (Pearson, 1900). The test was used to identify significant differences in responses between male and female participants, between parents and non-parents as well as among parents with children of different ages. We created tables showing the total counts of answers divided by gender and parental status. The χ^2 value is calculated for each cell as the squared difference between the observed and expected value divided by the

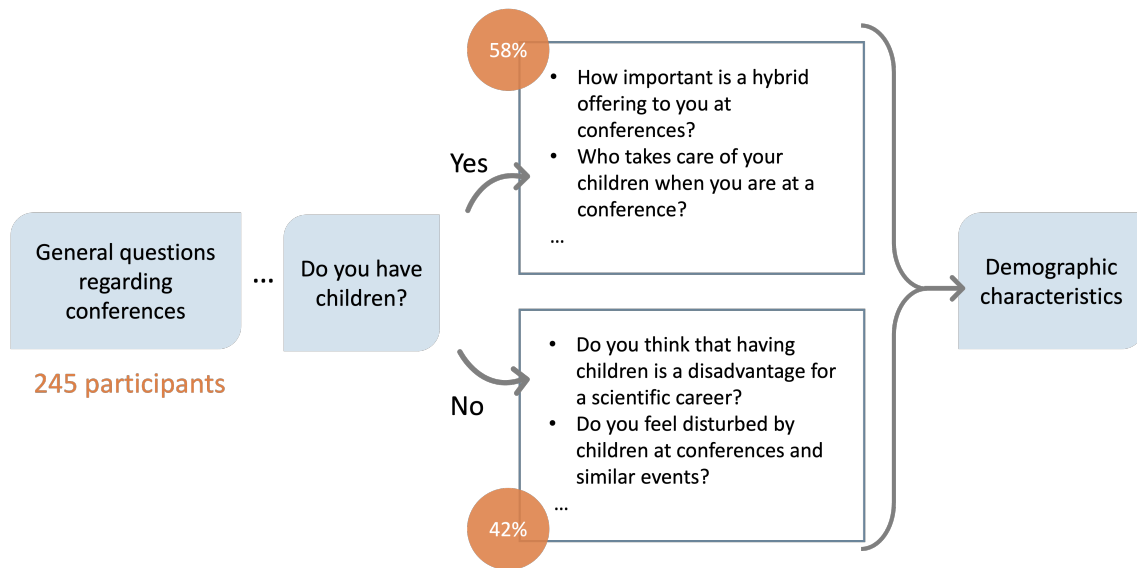


Figure 1. Structure of the online survey.

160 expected value. The expected value describes how the numbers would be distributed assuming that they do not correlate with gender or parental status. The cell χ^2 values are then summed up to derive the χ^2 statistic of the table. Additionally, we derived the probability-value p , which considers the probability that, assuming the collected responses are independent of gender and parental status, the same distribution would have been obtained (McHugh, 2013). For $p < 0.05$ the variables examined are commonly assumed dependent (McHugh, 2013). Moreover, to give caregivers the opportunity to include their

165 own ideas, feelings, and experience of family-friendly conferences, a free text question “What would you wish for to increase a family-friendly environment on conferences or workshops?” was included in the survey. Answers to this open question were analyzed using a qualitative content analysis by inductive category formation following Mayring and Fenzl (2019). We used the web based tool QCMap (Association for Supporting Qualitative Research ASQ, 2020) and categorized the answers with the analysis question “What do parents wish for to increase the family-friendly environment on conferences?” by going

170 through them line by line. The categories were formed inductively based on the answers-given-given answers. The software QCMap provided an overview of how many answers were sorted into which category (Appendix D). Based on the categories, the importance of the mentioned topics were-was evaluated. To validate our results, we performed an intercode agreement check (Mayring and Fenzl, 2019). A, where a non-involved student assistant applied the same analysis to gain an independent perspective on the categories (Mayring and Fenzl, 2019). Finally, the results were compared to hers-the student’s (Fig. D1).

The analysis of our survey followed two main questions: (1) How can caregivers be supported at scientific conferences? (2) What do scientists without children think about family-friendly offers at conferences? Based on our survey, we aimed to answer these questions qualitatively. In addition, ~~based-on-the-survey~~, guidelines for conference organizers are proposed.

3.1 Demography

180 The survey was completed by 245 scientists with 56% identifying themselves as female. Most of the participants (73%) were between 25 and 44 years old. ~~The participants came from various academic backgrounds and attended a diverse range of conferences, 69% visiting two or more conferences per year (Fig. 2). 6% of the scientists were younger than 25 and 17% older than 44 years.~~ A slight majority of 58% of all participants were caregivers (~~60% of which are mothers and 40% are fathers~~). These caregivers had one or more children in a range of ages that we grouped ~~into children younger than 3 years (based on~~
 185 ~~the age of the youngest child~~. 37% of all caregivers ~~), 3-6 years (46% of all caregivers), 7-10 years (35% of all caregivers) and older children (33.4% of all caregivers)~~ had a child younger than three years, 32% reported their youngest child to be between 3-6 years and 31% had their youngest child older than 7 years. Therefore, each age group ~~represented~~ was represented by at least one third of all caregivers.

~~We did not ask about the number of children in the survey. However, based on the number of child age ranges the participants selected, we can infer that 54% of parents have one child or more children in the same age range, 40% have at least two children and 6% have at least three children.~~ One participant identified as non-binary and one selected the option “Other” ~~when asking about the participants’ gender~~. In addition, nine participants skipped the gender question. When analyzing gender dynamics, we did not include these groups because their numbers were too small.

~~The participants came from various academic backgrounds in the geoscientific field. 8% were students, 17% PhD candidates, 22% Post-Docs, 24% lecturer, 23% staff member. Among parents, the largest group was lecturers with 35% followed by staff members and postdocs with 27% and 26% respectively. The largest group of scientists without children was represented by doctoral students with 30% followed by staff members and Post-Docs with 18% and 17%. In the survey, we did not specifically ask the participants if they worked in the private sector, a research facility or at the university. The participants attended a wide range of scientific conferences within the geoscientific field. Approximately 40% (48% of parents and 28% of participants without children) already participated in the EGU GA and 16% (20% of parents and 10% of participants without children) attended at least once the AGU Fall Meeting. 69% of the participants visit two or more conferences per year (Fig. 2). The number of conferences the participants stated to visit per year is not significantly correlated with the gender, parental status or age of participants’ children. However, it is noteworthy that 32% of fathers with a youngest child under the age of three and 16% of mothers with a youngest child under the age of three reported to attend conferences and workshops three or more times per year. Most of the participants completing the english survey stated that they work in Germany (49%) or a different European country (most frequently mentioned was Spain, Sweden, and France). 6 participants stated to work outside of Europe (US, Mexico and Qatar).~~

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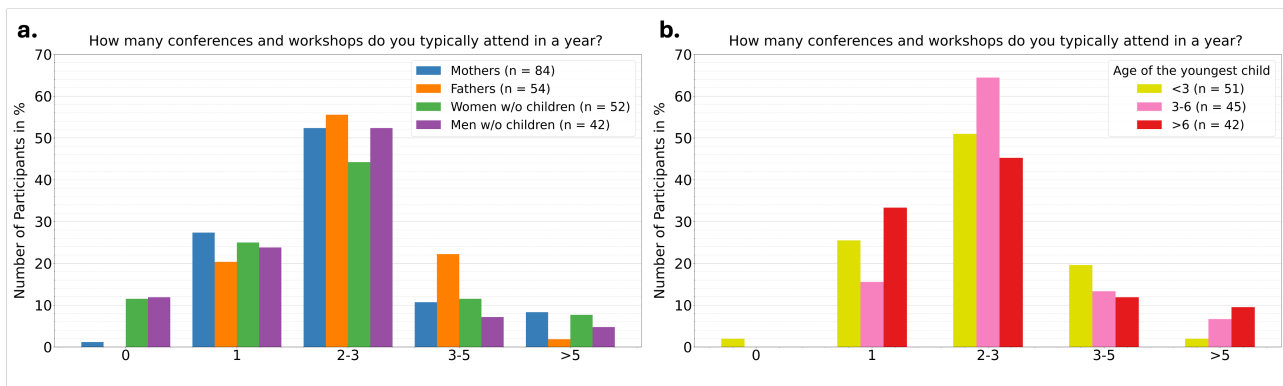


Figure 2. Answers ~~on-to~~ the question 'How many conferences and workshops do you typically attend in a year?' Only one answer was possible. The type of conference (i.e. online/in-person) was not specified. This question was posed to all participants (245) and skipped by five participants. 240 participants answered this question. In order to calculate the χ^2 statistic the response options "0" and "1" as well as "3-5" and ">5" were merged. Panel a shows the responses according to the specified gender ($\chi^2 = 0.66, p = 0.72$) and parental status ($\chi^2 = 3.31, p = 0.191$). Panel b shows the answers among the parents (139 in total) further resolved by the age of their youngest child ($\chi^2 = 4.48, p = 0.345$).

3.2 How can parents be supported at conferences?

The need for support for families at conferences was particularly evident in the survey: 78.3% of the mothers and 60.0% of the fathers stated that they could not attend a conference due to family obligations in the past. Furthermore, approximately 77% of all participants agreed or strongly agreed ~~with the statement~~ that having children ~~was is~~ a disadvantage for a scientific career. ~~Here, mothers feel particularly often that children are a disadvantage to their career compared to colleagues without children (Fig. 3)~~ Among scientists without children this perception is particularly pronounced, 87% of all women and 81% of all men agreed or strongly agreed to this statement (Fig. 3). Mothers share this view, with 81% agreeing or strongly agreeing. They are the group with the highest proportion of votes for "strongly agree" (39%). In contrast, 67% of fathers agree or strongly agree that having children is a disadvantage. The strongest difference in the participants' answers can be found between mothers and fathers ($\chi^2 = 5.10, p = 0.078$). However, the Pearson χ^2 statistic shows, that neither gender ($\chi^2 = 3.70, p = 0.157$) nor parental status ($\chi^2 = 1.51, p = 0.469$) is significantly correlated with the perception of children as a disadvantage for a scientific career.

Based on the ~~parent's~~ parents' answers to the question "What would you wish for to increase a family-friendly environment on conferences or workshops?" using inductive category formation, we deduced the following four categories for family support:

- (1) Family-friendly infrastructure at conferences including (a) Possibilities for exchange and networking for parents, (b) Events, where ~~Children are explicitly Welcomed~~ children are explicitly welcomed, (c) Family-friendly event schedule,
- (d) Childcare and rooms explicitly designed for families, ~~(e) Hybrid events~~

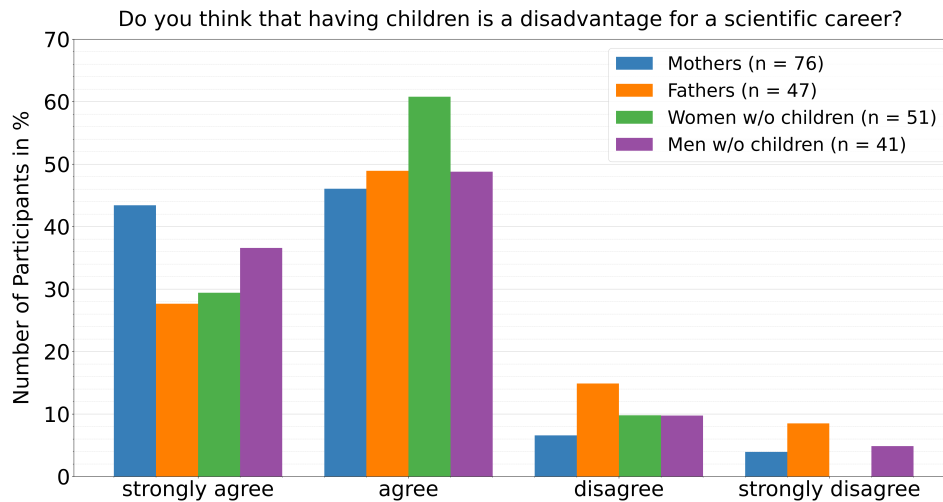


Figure 3. Answers to the question "Do you think that having children is a disadvantage for a scientific career?". ~~126 parents~~ 215 participants answered this question (skipped by ~~1535~~). The answers are sorted into the indicated gender ($\chi^2 = 3.70, p = 0.157$) and parental status ($\chi^2 = 1.51, p = 0.469$). On order to calculate the χ^2 statistic, the response options "disagree" and "strongly disagree" were merged. The shown percentages correspond to the respective group.

~~(2) Financial support~~

~~(3) Awareness~~

~~(2) Hybrid events~~

~~(3) Financial support~~

230 (4) Awareness for the challenges of parents in academia

~~(5) Clear communication and transparency by conference organizers~~

(1) Family-friendly infrastructure at conferences

The category of family-friendly infrastructures focused on the support offered during the conference and at the conference site. As shown in Fig. 4, 43% of the mothers and 24% of the fathers stated that they have already taken their children to conferences. In this respect, it is striking that the number of mothers is almost 80% higher. At the same time, 32% of all mothers and 28% of all fathers would like to bring their children to future conferences. Figure 5 summarizes the relative importance of family-friendly infrastructure offerings to the parents interviewed. 13% of the participants that already brought their children to conferences stated that they would like to do so in the future, while 32% of those who said they have not taken

240 their children to conferences said they would like to. None of the parents selected both that they already brought their children
and would not like to take them in the future. In this context, it should be mentioned that the participants were not explicitly
asked to select two out of the four options and 63% only selected one. More of the parents that have already taken their children
to conferences state that they visit three or more conferences a year (28%), compared to the colleagues that have not brought
their children along (13%). The answers did not differ significantly by the age of the children. About one third of parents in
245 each group (with the youngest child under three years, between three and six years and over six years) said they already brought
their children along. However, more parents with children older than six years reported that they have not brought their children
to conferences (56%) and fewer of them expressed the desire to bring children in the future (23%), compared to the other two
age groups. Among parents with younger children, 48% had not brought their children to conferences and 36% (under three
years) and 34% (three to six years) said they would like to bring them. Some 23 parents prefer to attend conferences without
250 children. Those caregivers stated “I prefer going without my child to conferences for networking.” and “Talks are important,
but networking is more important.”.

~~Have you ever taken your kids to a conference? Multiple answers possible. Only participants with children answered this question (134 participants in total). Skipped by 7. The answers are sorted into the indicated gender (only answers from mothers and fathers included here). The shown percentages correspond to the respective group.~~

255 ~~To allow caregivers to bring their children, inclusive scheduling of talks and events is the way to go, but it is equally important~~
~~to communicate to parents explicitly when they are welcome to bring their children to an event. Furthermore, it is important~~
~~to recognize that parents, as a group, can provide an invaluable support structure for each other. Therefore, organizers may~~
~~find it wise to use these existing resources by creating forums that specifically target parents. Networking is a high priority for~~
~~caregivers, of whom 39% named it their main concern (Fig. 5).~~

260 ~~Apart from integrating children into their parents' conference activities, it is important to provide them with their own~~
~~spaces, e.g., a room where they can do their homework or even dedicated events, where the research is presented to children~~
~~in an age-appropriate manner. While older children are well served with the aforementioned offers, young children require~~
~~childcare. Figure 5 summarizes the relative importance of family-friendly infrastructure offers to the parents interviewed.~~
Childcare service was rated ~~as~~ helpful by 71% of the caregivers ~~interviewed~~ (Fig. 5). Daycare is the necessary precondition for
many parents to be able to bring their children along. However, when implementing childcare services, multiple aspects have
265 to be considered. Especially at international conferences, children are going to speak different languages. To make all children
feel welcome, it would be ideal to have ~~babysitters~~ child care personnel who are fluent in several languages. In this context, it is
crucial to provide an environment that feels safe for both the parent and their child. This entails that childcare rooms are easy to
reach from the lecture rooms, the atmosphere is welcoming and parents can get in contact with the childcare personnel anytime.
Another important consideration is that conference schedules and the specific needs of children are individual, which should be
270 reflected in a flexible daycare that allows children to ~~drop-off and pick-~~ be dropped off and picked up at different times. To allow
caregivers to bring their children to conferences, inclusive scheduling of talks and events, such as holding them during the
offered childcare hours, is necessary, but it is equally important to communicate to parents explicitly when they are welcome
to bring their children to an event. Multiple parents reported that evening events are especially challenging to attend when they

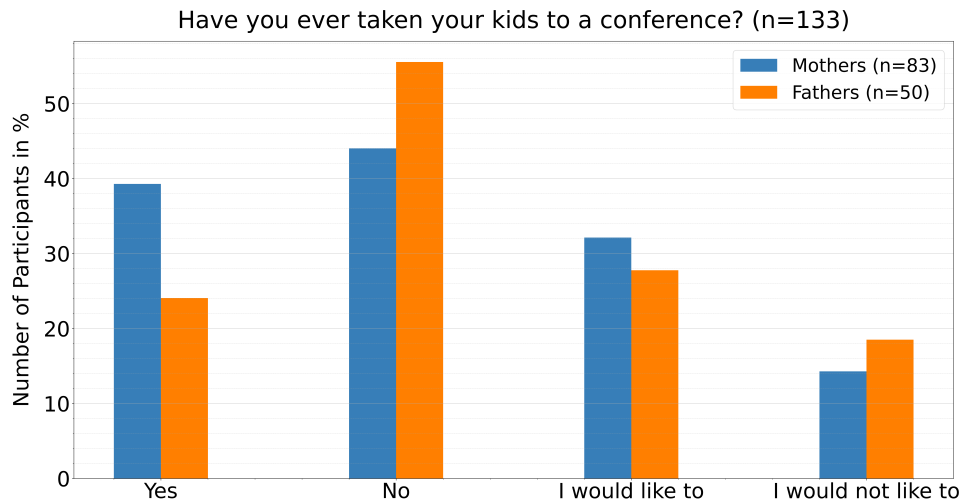


Figure 4. Have you ever taken your kids to a conference? Multiple answers possible. Only participants with children answered this question (134 participants in total). Skipped by 7. The answers are sorted into the indicated gender ($\chi^2 = 3.74$, $p = 0.291$). The shown percentages correspond to the respective group.

have their children with them. Apart from integrating children into their parents' conference schedule, it is important to provide them with their own spaces, e.g., a room where they can do their homework or even dedicated events, where the research is presented to children in an age-appropriate manner. Family-friendly activities and playrooms/playgrounds for children were selected helpful by 67% and 65% parents respectively. Furthermore, it is important to recognize that parents, as a group, can provide an invaluable support structure for each other, as one respondent said: "If more colleagues took advantage of such an [childcare] offer, the situation would also improve because the children could travel in groups and thus have a "replacement circle of friends" with them." (translated from German to English). Therefore, organizers might use these existing resources by creating forums that specifically target parents, where they can network ahead of the conference and exchange information and experiences concerning the conference visit with children. Networking is a high priority for caregivers, of whom 39% named it their main concern (Fig. 5). Additionally, rooms for families that serve other purposes, for example breastfeeding rooms are voted helpful by 28% of parents.

3.3 (2) Hybrid events

When asked about the possibility of online participation, 76% of the parents rated hybrid events as important or very important. ~~While they acknowledged that this~~ However, only 3% of the free text answers by parents included the topic of hybrid events. While parents acknowledged that online participation would mean losing out on some of the conference experience, as one respondent remarked "Hybrid meetings are OK but you are still left behind if you don't show your face.

Which of these offerings might help you at conferences and similar events? (n=139)

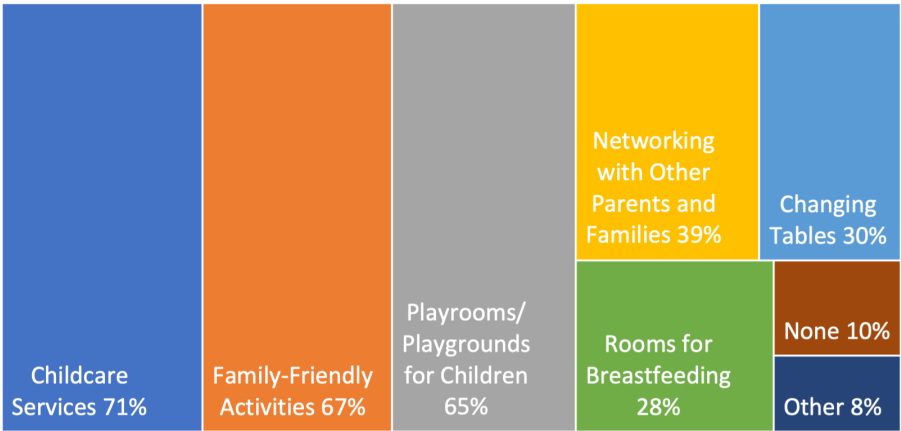


Figure 5. Hierarchy plot of the answers to the question "Which of these offerings-offers might help you at conferences and similar events?". Multiple answers were possible. Only participants with children answered this question (139 participants in total). Skipped by 2. [Graphic was originally published in Pääffgen \(2024\), is licensed under CC BY 4.0 \(https://creativecommons.org/licenses/by/4.0/\).](#)

290 ", an online participation seemed, for many-some of the interviewed caregivers, to be the only option to attend at all:-. "[I prefer] Hybrid or fully virtual conferences. I avoid traveling as much as possible." . Since the COVID-19 pandemic, conferences have taken different approaches on including online participation into their meetings. For instance, the Canadian Meteorological and Oceanographic Society (CMOS) alternates between hybrid and fully online meetings for their yearly congress (Canadian Meteorological and Oceanographic Society (CMOS)). The MeteoXChange conference is a fully virtual event for early-career researchers in the field of atmospheric sciences created based on the GatherTown platform (MeteoXchange; Gather Town).

(23) Financial support

Even though it is convenient to attend an event online, sometimes it is crucial-to-attend-important to participate in a conference in person. To enable participation for parents, a financial infrastructure along-with-the-digital-one-to-cover additional expenses for parents is needed. Of the 66 responses from parents to the question "What would you wish for to increase a family-friendly environment on conferences or workshops?", 29 included requests for financial assistance from institutions and conference organizers. Some participants stated that financial support for families, when available, is often too low and comes with extensive documentation. Other parents complained-expressed concern that bringing their partner to take care of the child to the conference means that the partner has to take leave for the travel and usually must pay the additional travel and accommodation costs. Conference fees for children or caretakers were said to add to these costs. Also, childcare offered at the conference site was claimed to be expensive at times. Scientists who choose to leave their child at home supervised by the partner or

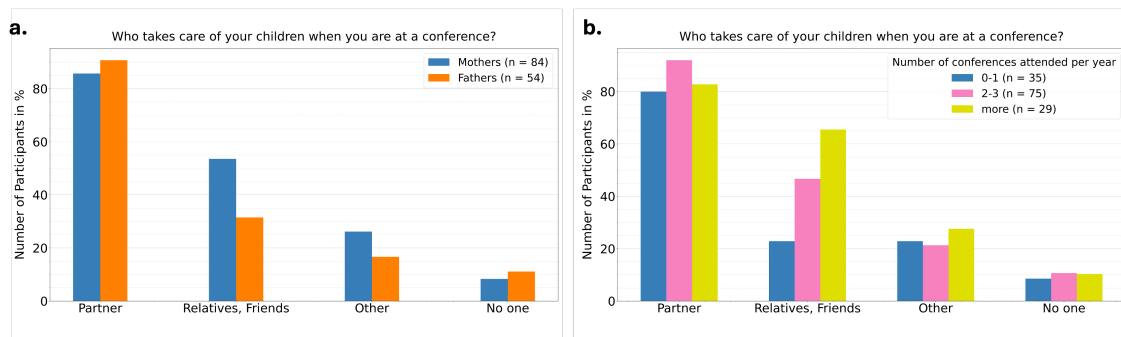


Figure 6. Answers to the question 'Who takes care of your children when you are at a conference?' Only participants with children answered this question (139 participants in total). Skipped by two. Only the Multiple answers of parents indicating their gender were possible. In order to simplify the plot and calculate the χ^2 statistic the categories "Parents", "Relatives" and "Friends" were merged to one "Relatives, Friends" category, as well as "femaleBabysitter" or and "maleOther" are shown were merged to the "Other" category. Panel a shows the responses according to the specified gender ($\chi^2 = 4.28, p = 0.232$). Panel b shows the answers among the parents resolved by the number of conferences they attend per year ($\chi^2 = 4.80, p = 0.570$).

a caretaker said they must either bear the costs for extra hours of daycare, or the partner would have to take leave. Here, in particular family members are taking up support tasks. With 92% of all fathers and 87% of all mothers, parents rely heavily on their partner when attending a conference (Fig. 6). 48.8a. 49% of women with children state that they sometimes resort to their parents or other relatives and 13% resort to a babysitter for care taking. Fewer fathers use these options with 27.828% and 8%, respectively (Fig. 6)-a.). For all age groups of the youngest child (under three, between three and six, and above six years), over 80% of parents choose their partner as the caretaker (not shown). Parents with children under three years more frequently rely on babysitters than those with older children. Additionally, parents whose youngest child is older than six years are more likely to report "No one", possibly reflecting that older children require less direct care. We do not find a significant difference between mothers and fathers, nor among parents with children of different age groups, in their choice of caretaker when attending a conference. Fig. 6b. shows that parents who frequently attend conferences and workshops are more likely to rely on relatives and friends for childcare than those who attend less often. Specifically, 23% of parents that attend only 0-1 time per year selected relatives and friends as caregivers, while 66% of those attending more than 3 times a year did so.

(34) Awareness for the challenges of parents in academia

Parents often feel isolated and overwhelmed by their role as caretakers within the academic world. One participant expressed this sentiment with the comment, "Make it normal to have kids," reflecting the perceived loneliness associated with balancing parental responsibilities.

Parenting is often treated as a solitary challenge and can feel isolating for scientists (Windsor and Crawford, 2020). Scientists in our survey felt that they are missing out when unable to participate in conferences as fully as their colleagues without children. This sense of being left behind by the scientific community places significant pressure on parents, as one

respondent stated: "I can already tell that I'm being left behind by the international community." Awareness for parents at scientific conferences means recognition of their specific needs by organizers and fellow participants. A lack of awareness can become particularly visible in conference settings. For instance, respondents mentioned difficulties such as session scheduling outside of childcare hours, networking events late in the evening or involving alcohol, no transparent information on childcare facilities, accommodation that is not well-prepared for families and complicated application procedures for financial funding. This aligns with the experiences shared by Carter et al. (2024) who report "A common experience was that our colleagues thought that traveling for work with our children somehow meant trying to take our kids on holiday, when in fact we were desperately juggling childcare and our careers." Increased awareness among conference organizers and attendees could lead to improvements such as more intentional scheduling, the inclusion of family-friendly social events, a more transparent presentation of family support options and a more inclusive culture that normalizes parental responsibilities within academic networking and participation. Fostering a broader culture of family support is a critical part in enhancing work-life balance in academia and the mere presence of family-friendly policies may result in these measures being overlooked (Feeney and Stritch, 2019)

(4) Clear communication and transparency

~~Life situations and needs of families are diverse.~~

(5) Clear communication and transparency by conference organizers

Family-friendly conference organization ~~therefore~~ requires good and ongoing mutual communication between the organizers and the families, as well as the possibility for individual and creative solutions. The lack of transparency on family support options increases the mental load and organizational effort that parents must bear prior to attending conferences. Unclear or inconsistent information often means long lead times to arrange childcare, uncertainty about whether funding requests will be approved, time and cognitive effort that has to be spent to advocate for one's needs repeatedly across different departments or organizers. No matter how well the family support system might be, it is useless if the information is not effectively passed on to the families who need it. Our survey revealed that 67.4% of parents do not feel well-informed about support ~~offerings~~ offers for families. To address this, the following information is ~~crucial~~ relevant: First, it is essential to clearly define when and where children are welcome during different conference events, helping families plan their participation without unexpected challenges. Second, releasing the conference program well in advance gives families enough time to organize their trip, arrange work leave, and apply for funding if they plan to bring their children. Third, it is essential to offer comprehensive details about the childcare services available during the conference, including hours of operation, qualifications of caregivers, prices, and how to register. The more detailed the information is, the more secure parents feel to leave their children at the provided daycare options. Additionally, confirmation of childcare services should be provided before the registration for the conferences, so that parents can make an informed decision about attending in person. A list of activities available for families in the vicinity of the conference venue can be very helpful, offering them options to explore and enjoy their time together. The survey showed that for several parents visits to the playground for example have improved their conference experience: "At the EGU, we

went to the water playground on the old Donau at lunchtime, which was great compensation for the children ~~coming~~ coming back to the conference and sitting through a few presentations.” (translated from German to English). In addition, sharing a list of affordable hotels that focus on families makes it easier to find a suitable accommodation. On-site, detailed information about the family-friendly infrastructure should be provided, including facilities like nursing rooms, play areas, and restrooms equipped for young children. ~~Plus~~In addition, sessions that cover the family-work conflict or similar topics can get their own tag so that they are easier to find in the conference program. Including the option of adding a sticker to conference attendees’ name batch that indicates that they are a parent, can help parents at the conference to find each other and be a conversation starter. Beyond logistics, it is vital to explicitly communicate that families are welcome at the event. It raises awareness of people with family responsibilities and makes parents feel seen. This can already be achieved by a prominent statement on the conference website or a mail with information for parents distributed among all attendees. Encouraging communication among attending parents before the conference, allowing them to connect and network based on shared experiences, can also help distribute the information about the support in place. Additionally, clarify how many tickets are needed if children or partners are brought along, ensuring families can plan their budget accordingly. Finally, it is important to communicate that special arrangements can be made for families with unique needs, offering flexibility and personalized support. This can be achieved, for example, by setting up a dedicated e-mail address or telephone number. Being transparent also includes communicating, which support options are not available at the conference, so that parents have no reason to worry.

3.4 What do scientists without children think?

Including the perspectives of scientists without children in this discussion is essential for two reasons: First, to secure their support as allies, and second, because they may eventually become parents themselves. A transformation towards a more family-friendly environment at conferences will impact all attendees. Therefore, ~~it is crucial to implement the changes thoughtfully~~the changes should be implemented with care, ensuring that no tension arises between those with and without children. Participants without children were asked whether they felt disturbed by the presence of children at conferences. A majority of 71% indicated that they ~~were not do not feel~~ disturbed. However, ~~21% expressed that they feel disturbed~~a few respondents without children expressed objections, with comments such as “Children DO NOT belong at work events.” and “Conferences are in my opinion too loud, too crowded and too busy for children.”. Therefore, it can be helpful to clearly designate where children are welcome, whether in sessions, lectures, workshops, or during free-time activities, and where they are not.

Most of the participants (79%) without children do not think that conferences are designed to be ~~family-friendly~~family-friendly (Fig. 7). Male ~~and female scientists disagree or strongly disagree with the statement that conferences are designed to be family-friendly~~. However, male participants leaned more towards ~~strongly disagree~~“strongly disagree”, while female participants significantly more often selected “disagree” ($\chi^2 = 7.88, p = 0.019$). Overall, 84% of participants without children agreed or strongly agreed on the need to expand family-friendly ~~offerings~~offers at conferences, indicating strong support from the broader community. This is important, as funding for such initiatives may come from the shared conference budget. Not only does the majority favor increasing support for families, but 80% (79.06% of all male and 83.01% of all female scientists) are also willing to actively participate in these efforts (Fig.8). ~~Such events~~Conference events, where scientists showcase their

Do you feel that conferences and similar events are designed to be family-friendly? (n=95)

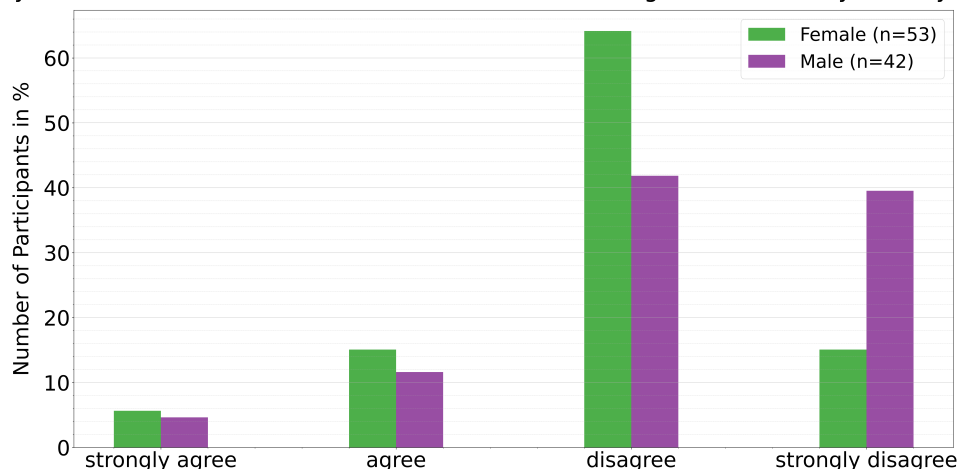


Figure 7. Answers to the questions 'Do you feel that conferences and similar events are designed to be family-friendly?' Only one answer is possible. Only participants without children answered this question (103 participants in total). Skipped by 1. The answers are resolved according to indicated gender ($\chi^2 = 7.88, p = 0.019$). In order to calculate the χ^2 statistic, the categories agree and strongly agree were merged. Only the answers of female and male participants are included in this plot.

research to children could help researchers to gain a new perspective on their work and at the same time would be an opportunity to make the conference stay for children memorable.

395 3.5 Composition of a guide for conference or workshop organizers

~~Conferences still need to improve in the field of equity, diversity and inclusion. For example, multiple studies show that engagement in discussions is dominated by senior men (Lefebvre and Bernhard, 2024; Jarvis et al., 2022; Gulland, 2022). Increasing family support at conferences can diversify the community, leading to more innovative results (Calisi and C. Lopes, 2018). Conferences play a critical role in promoting inclusion. However, addressing the needs of parents requires a high degree of flexibility, as their needs are highly individual. These vary with child age, family situation and the support provided by the researcher's home institution. It is important to note that not all needs can be met.~~

~~There are conferences in the geoscientific field that already try to become more inclusive. However, since~~ Since there are no unified guidelines on how to integrate family-friendly measures into conference organizations, every conference takes its own approach, leaving parents in a maze of different programs. At the same time, the resources and options available to conference organizers vary significantly depending on the event format. International conferences face other challenges than national events. Conferences with varying locations need different approaches than conferences that occur at the same venue each year. To address these challenges effectively, it is crucial that each organizing committee appoint a dedicated commissioner

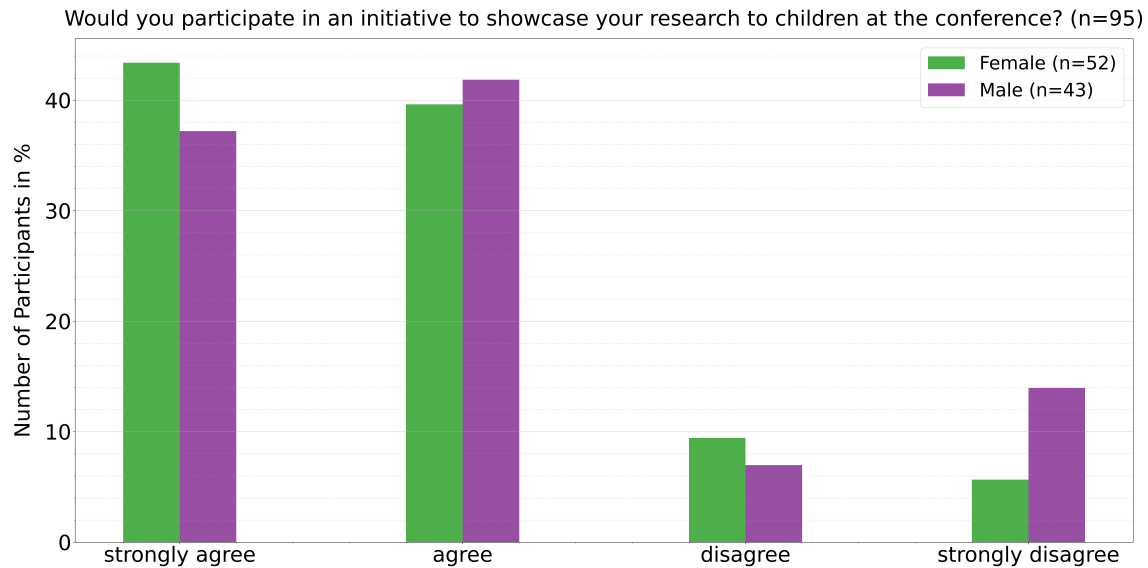


Figure 8. Answers to the questions ‘Would you participate in an initiative to showcase your research to children at the conference?’ Only one answer is possible. Only participants without children answered this question (102 participants in total). Skipped by 2. The answers are resolved according to indicated gender ($\chi^2 = 0.70$, $p = 0.705$). In order to calculate the χ^2 statistic, the categories disagree and strongly disagree were merged. Only the answers of female and male participants are included in this plot.

responsible for family support. In general, conferences should make it a priority to talk to parents and subsequently incorporate their suggestions and feedback into the design of the event.

410 Based on our results, we propose a guide structured to progress from ~~initiatives~~ support measures requiring minimal financial and organizational effort from event organizers to those demanding greater resources and planning. ~~The guide provides~~ Certain measures, such as waiving fees for caregivers accompanying participants, providing information of the family-friendly infrastructure nearby the conference center (e.g., playgrounds), or family-friendly programming, represent low-cost, achievable measures, as they impose a minimal financial burden to conference organizers and can be facilitated

415 through volunteer engagement. Since accompanying caregivers do not participate in conference activities, it would add no extra costs to grant them free access to the conference venue. We encourage conference organizers to adopt a family-inclusive conference schedule by avoiding planning important events in the evening and including child-friendly networking possibilities during the day (Coombs, 2023). Additionally, organizers can already consider family needs when selecting a venue for their event, e.g., ensuring that changing tables and family rooms are available and easily accessible with strollers. A prominent

420 statement on the conference website and in distributed emails affirming that parents are welcome and providing a point of contact for requests can help parents feel acknowledged and supported and at the same time creates visibility for researchers with care responsibilities. This approach helps to normalize bringing children to sessions and encourages parents to ask for additional support if needed. Compiling information for activities for families in the area and hotels that are suitable

to accommodate families, requires minimal organizational effort, no extra funding and can in turn reduce the mental load
425 for attending parents. Langin (2018) evaluated the family support of 34 scientific conferences in North America of different
disciplines, interviewed parents about their experience and compiled possible “baby steps” towards family-inclusive conferences.
Their recommendations focus on fostering a child-friendly atmosphere and providing family-friendly spaces to watch the
children and connect with other parents. On-site childcare, financial support of families and hybrid event formats require
substantial resources that might exceed conference budgets. However, as these offers represent the most important support
430 options for parents in this survey, organizers should consider to seek some additional funding or to reallocate resources to
provide them. Depending on the size of the event, organizers could partner with local family offices, universities or professional
daycare providers to arrange babysitters and play areas for children. The extra costs might be covered by the registration fee
or through sponsorships from companies or organizations. To ensure these services are well used, it might be helpful to ask all
potential attendees in advance about their requirements and tailor the offers respectively. Financial support grants for families
435 can be scaled according to the resources available. Addressing the needs of parents requires a high degree of flexibility, as they
vary with child age, family situation and the support provided by the researcher’s home institution. One respondent suggested
“Extending deadlines for parents or offering all-time early bird prices for parents.”. We also received the suggestion that
parents can get single day tickets since sometimes it is only possible to attend the event on certain days. This is supported by
Feeney and Stritch (2019) who found that for women in the US working in the public sector it is important to promote policies
440 that can be tailored to the particular family situation. The proposed guide provides a basis of concrete, actionable ideas to
ensure practical relevance for conference organizers. The recommendations are directly derived from our survey responses,
addressing real-world challenges and needs of families. In Appendix A, the guide is presented as a check list organized by
measures that can support families before, during and after the conference. ~~Similar findings are~~ The checklist is in accordance
with the findings presented by Saccarelli et al. (2020) in the field of radiology and by Calisi and C. Lopes (2018), wherein a
445 working group of mothers proposes CARE guidelines to “tackle the childcare-conference conundrum”.

4 Discussion

~~The survey results of our study show the~~ Most of the researchers interviewed reported attending conferences and workshops
twice or more times per year, indicating that these events play an important role in their professional lives. Interestingly, no
significant difference was found between participants with and without children. This suggests that work-family conflict is not
450 directly reflected in the conference attendance rates alone. However, several other factors that were not resolved here need
to be considered, such as the career stage of the participants, the caregiving arrangements and the type of conferences or
workshops they attend, as this was not specified in the question. Calisi and C. Lopes (2018) states that “primary caregivers
(particularly single parents, nursing parents, or parents of special-needs children) are often limited when it comes to the
number of conferences they can attend”. Parents might consider attending conferences and workshops that are close to
455 their workplace to avoid long travels or even being able to return home in the evening or attend conferences online, while
their childless peers might be able to visit international conferences. As we do not have any data on the type of workshops

and conferences the participants attend, we cannot verify this hypothesis. Our data shows that mothers with the youngest children (younger than 3 years) less frequently visit conferences than fathers in this age group. This agrees with the finding of Santos and Cabral-Cardoso (2008) that mothers of dependent children are most affected by tensions between academic work and family life. While the attendance rates alone do not capture the challenges faced by researchers with families, the urgency of family support in academia ~~-.The results show that balancing academic-~~ is clearly shown in this survey as the majority of interviewed parents reported that they missed conferences in the past due to family obligations. Balancing work and family responsibilities remains a major difficulty. ~~Most of the scientists interviewed perceived having children as concern, with most academics perceiving parenthood as a disadvantage for their scientific career. Especially female participants shared this~~ sentiment. This finding is consistent with previous research that documents gendered experiences of parental bias in academia (e.g., Gaio Santos and Cabral-Cardoso, 2008; Santos and Cabral-Cardoso, 2008; Staniscuaski et al., 2023). For instance, Staniscuaski et al. conducted a survey among 995 Brazilian scientists who are parents to investigate the perceived parental bias and found that mothers were more likely to report that they experience negative bias due to their care responsibilities than fathers. Our data reinforce the hypothesis that parenthood, particularly motherhood, remains a structural barrier to equal participation in academia, often referred to as the “motherhood penalty” (e.g., Goulden et al., 2011; Correll et al., 2007). As one interviewed women expressed, “I am not directly working in science anymore, because I have kids and want to be there for them.”. This personal report illustrates how caregiving responsibilities can shape the career trajectories for women. However, the difference between men and women in their perception of parenthood as a disadvantage for a scientific career ~~-.Especially for women with children, the work-family conflict persists. This agrees with the finding of Santos and Cabral-Cardoso (2008) that mothers of dependent children are most affected by tensions between academic work and family life.-~~

A range of very different responses showed that was not significant in our data. Fathers and men without children also largely reported an interference of family life and academic work. One interviewed father said “I stopped going to conferences when I had my kid”. This aligns with the findings of Cech and Blair-Loy (2019), who analyzed the career trajectories of new parents in STEM fields in the US and found that while mothers are more likely than fathers to leave their profession, parenthood affects the academic career of both genders and is not only a “mother’s problem”(Cech and Blair-Loy, 2019, p. 5). Our study suggests that the frequency in which parents attend conferences also depends on their social support system. The majority of the interviewed participants rely on their partner for care taking when they visit conferences. Additionally, parents who attend three or more conferences a year were more likely to involve a wider social circle for caregiving, such as friends or relatives. As a consequence, this could mean much greater barriers to conference participation for single parents and parents with little support from their social environment. A higher percentage of mothers than fathers in our study have already taken their children to a conference. Nevertheless, about thirty percent of both groups would like to bring their children to conferences in the future. The interest for bringing children to conferences is higher among parents with small children. Our study shows that parents who bring their children along, visit more conferences per year, which suggests that family support at the conference site can increase the participation for parents. The wide range of responses suggests that what constitutes a family-friendly conference ~~looks different for every parent~~ differs significantly from one parent to another. Within the results, we identified multiple facets of family support, namely “Family-friendly infrastructure”, “Hybrid events”, “Financial support”, “Awareness”

and “Clear communication and transparency”. In agreement with Singh et al. (2018), the need for socio-emotional support as well as tangible support, such as childcare and funding, is evident in the answers of parents.

~~The possibility of exchange and networking plays an important role for parents as it is an integral part of the conference experience. There is an understanding among researchers that networking is important for a successful career in academia (Ansmann et al., 2014; Fisher and Trautner, 2022; Li et al., 2022; Hauss, 2020). Conferences are crucial to building and maintaining a network that can be beneficial for collaboration and publishing activities. Conferences usually offer dedicated networking events, such as coffee breaks, an ice breaker, or a reception and conference dinner. Since these events are often held in the evening and sometimes involve the consumption of alcohol, they often exclude scientists with children. Actively integrating family life into conference events and creating dedicated spaces for families could mitigate the described disadvantages.~~

~~In addition, conference organizers should think about inclusive, hybrid or online options that replace in-person networking. Dedication to digitizing all of the conference events and increasing the virtual experience opens the door not only for families, but also for scientists with other care responsibilities, few financial resources or disabilities.~~

~~For many families having~~ In our survey, childcare has proven to be one of the most important forms of support for families at conferences. This is not surprising, as it has been suggested by other studies that focus on increasing EDI at conferences (Calisi and C. Lopes, 2018; Saccarelli et al., 2020; Sardelis et al., 2017). Having professional daycare options ~~would be a significant help. Making them~~ free of charge would be a good way to accommodate parents financially. However, especially for scientists with young children and nursing mothers, giving them the possibility to bring their own babysitter or caregiver, i.e. a partner or relative, along, is even more important, since “[Children] need a reference person until a certain age.” (Answer of a parent). Accompanying persons can be integrated by allowing them to enter free of charge. In parallel to daycare options, breast-feeding rooms and accessibility with strollers should be provided, because they affect those children who are the most dependent on their parents. ~~In the spirit of inclusion, changing rooms should be open to all genders. In~~ general, rooms that are specifically dedicated to families would be helpful. These can serve a wide array of functions, from the mentioned breastfeeding rooms to a space where parents can watch their children and follow the conference via a life-stream. ~~The survey showed that scientists without children are very much in favor of greater support for families, so that it would be realistic to consider all participants paying for the additional costs that arise with the childcare options~~ Depending on the available budget for the event, the rooms can for instance be equipped with toys, nursing chairs or a fridge to store food for children. The possibility of exchange and networking plays an important role for parents as it is an integral part of the conference experience. Conferences usually offer dedicated networking events, such as coffee breaks, an ice breaker, or a reception and conference dinner. Since these events are often held in the evening and sometimes involve the consumption of alcohol, they exclude scientists with children. Additionally, parents reported that they want to check on their children during the breaks, so that they have no time to network during coffee breaks. Many parents reported not bringing their kids to conferences, because they would miss out on networking events. Actively integrating family life into conferences and creating networking opportunities that welcome bringing children and are scheduled during childcare hours could mitigate the described disadvantages and lead to higher visibility for parents at conferences. In addition, conference organizers should think about inclusive, hybrid or online options that replace in-person networking. Dedication to digitizing all of the conference events and increasing the virtual experience opens the door not

only for families, but also for scientists with other care responsibilities, few financial resources or disabilities. Even though hybrid participation options are important for parents, they cannot be the only support offer in place. The presence of parents at conferences is important to ensure their visibility in the academic community. Increasing the flexibility in conference fee payments, so that it is possible to join an event for a shorter period meets the needs of those parents that prefer attending the conference without their child. ~~Conference-~~In summary, conference organizers can explore the following policies to reduce costs for parents: (1) free childcare provided by the conference, (2) children and accompanying caregivers may attend the conference at no conference fee, (3) accommodation options for families are listed on the conference website, and (4) travel subsidy for parents who wish to bring their children. ~~These are the first steps to make several conference visits a year affordable for parents. Easy access to financial support is the key-~~As financial support was requested by 26% of parents, it is a key element to a more family-friendly environment at conferences.

~~The-~~Based on their experiences as researchers and mothers, Carter et al. (2024) developed recommendations for research grants that consider the needs of parents. As the recommendations address traveling with children, some of their recommendations are also relevant for travel grants offered by conferences. The authors advocate for flexibility in the use of the provided resources, so that they can be adapted to the family situation (e.g., either bringing children along or financing additional childcare at home). Additionally, they propose to simplify the application process for parents to make it more time efficient and recognize that parents have different personal circumstances. The mental load that parents bear, particularly around non-routine work events like conferences, demands a significant amount of planning. Establishing networks for families can help parents feel less isolated. In this regard, creating ~~a-~~an online platform for sharing personal stories and experiences could foster greater sensitivity to these challenges within the scientific community. In addition, educational initiatives such as panels on balancing parenthood with a scientific career during the conference (e.g., Kerch et al., 2025; Jesus-Rydin et al., 2024) would raise awareness and advance the conversation. Offering such sessions at conferences would likely lead to greater recognition of family responsibilities that would carry over into everyday work settings. This might give young women who start a degree in STEM geosciences a new perspective on their future-, to see personal and professional goals as complementary (Thoman et al., 2022) (Thoman et al., 2022; Smith Taillie, 2024). This is supported by Santos and Cabral-Cardoso (2008) concluding that “work-family policies are fruitless, unless they are supported by a positive work-family culture”. Furthermore, this would challenge the misconception that struggling to balance work and family is a result of personal shortcomings in talent, commitment, or organization, or of being an inadequate parent (McCarver, 2011).

It is evident that transparency on family support at conferences is a major issue, as the majority of parents reported that they do not feel well informed. This is a concerning result, but ~~it holds the chance of a very simple improvement of the current circumstances. A simple increase in transparency and easy-to-access information can already improve the conference experience for parents-~~can be improved by providing easy-to-access information for example through a webpage that gives a clear and detailed overview of all family support options in place and through integrating this information in all important emails, letters and guides distributed before the conferences (cf. Appendix A).

Scientists without children expressed strong support for family-friendly measures. This result is somewhat unexpected, as earlier studies often emphasized a lack of awareness among non-parents regarding these challenges (e.g., Ward and Wolf-Wendel, 2004)

. This could indicate a growing recognition within the broader academic community of the structural difficulties faced by caregivers and aligns with the findings of Langin (2018) who reports that there is a lot of interest from the scientific community to implement support infrastructure for families. The presented survey aimed to gather diverse opinions on the family-friendliness of academic conferences, with the goal of fostering dialogue between caregivers and event organizers and creating a guide for future improvements. It is important to note, however, that the survey was not designed to be statistically representative of the global scientific community. The target group comprised scientists worldwide, but the distribution pathways – primarily through European conferences and German institutions – led to a focus on European researchers, particularly those from Germany. This is reflected in the fact that more than 50% participants completed the German-language survey. Due to the absence of detailed demographic data on the global scientific community, we were unable to apply representative weighting to the responses. For future studies it might be useful to partner with international scientific organizations, to advertise the survey at international conferences and workshops and translate the survey into additional languages, to reach a broader audience globally. On the other hand a distortion of the sample group can be reduced by avoiding distributing the survey through personal/regional networks and events. We would also like to draw attention to the need to collect more data on parenthood globally to uncover links between parenthood and a scientific career. Our study focused on researchers from the geoscientific field and the results therefore reflect conditions for families within this specific academic community. However, the resulting guidelines can also be applied for conferences in other scientific areas as they are comparable to recommendations developed in other fields (Calisi and C. Lopes, 2018; Saccarelli et al., 2020). Childcare systems and family dynamics differ widely across countries, introducing variability that this study could not fully address. Despite these limitations, our work provides a qualitative overview of the current situation, highlighting perspectives from caregivers and sparking a constructive dialogue with conference organizers. Although this study primarily focused on the family responsibilities of parents, we acknowledge that the needs of those caring for elderly family members are equally significant. We hope that this work will serve as a basis for more inclusive practices in conference planning. Furthermore, while family support at conferences is an important step toward addressing these challenges, the answers of parents also point to the need for broader, systemic measures. In particular, support mechanisms should extend to everyday academic work, during field trips or routine research activities in order to ease the family-work tension in academia. As one respondent put it: “The problem is everyday life – too many things don’t work out and it costs a lot of organizational time and energy.”.

5 Conclusions

The presented survey with 245 participants from the geoscientific field provides a balanced view comprehensive insights into the difficulties of experienced by families in the context of conferences. The participants’ responses confirm the barriers for parents in academia already identified in the literature (Jean et al., 2015; Calisi and C. Lopes, 2018; Pohl et al., 2022; Angela L. Bos and Schneider, 2019) and highlight the difficulties faced by mothers in particular. The answers reveal a broad range of support options and needs. At the same time, it is evident that it is not only parents who wish for change recognize the need

[for family-friendly conferences](#). Participants without children also welcome a family-friendly transformation and are willing
595 to participate in it.

This work lays the foundation for a dialogue between parents and conference organizers and gives parents a voice in a work
environment where family responsibility is still rarely discussed. ~~A broad range of support options can be deduced from these
results that give conference organizers a chance to start somewhere.~~ Even though missing family support is only one of many
reasons for the underrepresentation of women in STEM, if implemented well it can significantly help diversify the scientific
600 community. The results of this survey provide conference organizers with clear tasks [by calling and call](#) for more transparency
and attention for families in academia. Future work should focus on specifying the guidelines outlined here and on extending
them to other subject areas and event formats.

Data availability. Anonymized data will be made available on request.

Appendix A: Guide for conference organizers

605 Before the conference:

- ☐ Promote existing offers: Through the website and/or emails, make attendees aware of available services (in detail) so that
families/parents feel welcome. This should be communicated well in advance of the conference to give families time to
plan and prepare. Even if there are few or no services available, this should be communicated to ensure transparency and
provide parents with a sense of security.
- 610 ☐ Provide a contact address or phone number: This should be available for questions regarding support for parents/families.
It can also be emphasized that conference organizers are willing to find individual solutions.
- ☐ List of activities: Provide a list of activities that can be done with children in the area (e.g., where the nearest playground
is from the conference center, good places for walks, etc.).
- ☐ Conference center map: Offer a map of the conference center indicating which areas are accessible with strollers, where
615 customer service, changing tables, nursing rooms, or other (quiet/family) rooms are located.
- ☐ Clarify registration for children and accompanying persons: Specify in advance if bringing a child to the conference
and/or an accompanying person requires registration and if there are any associated costs.
- ☐ Program markings: Clearly indicate in the program where children are welcome and where they are not.
- ☐ Forum for parents: Provide a forum where parents can connect and exchange information before the conference.
- 620 ☐ Selection of family-friendly accommodations: Provide a selection of accommodations that are family-friendly (e.g., offer
cribs, so that it is not necessary to book an extra hotel room for the child, which reduces costs).

- 625 ☐ Survey ~~during registration~~ : ~~Ask during registration if the participant plans to bring children and /or prior to registration~~ (e.g., during abstract submission): Ask participants at the abstract submission stage whether they require support for bringing children and an accompanying person. This allows the offers to be tailored to parents' needs. Communicate the available measures (including childcare spots and the allocation procedure) before registration so that parents can make an informed decision about attending in person.
- ☐ Consulting speakers: Ask speakers if they are comfortable with children being in the presentation room. Those who agree should be given guidelines on how to handle situations if children become disruptive.
- 630 ☐ Family-friendly networking events: Plan networking events that do not take place in the evening and/or where children can be brought along (e.g., with no alcohol served).
- ☐ Science sessions for children: Scientists could sign up to talk to children of a certain age group about their research for a few minutes in the afternoon.
- ☐ Financial support for families: Provide information on financial support available for families, including:
- 635 – Travel expenses for the child (and accompanying person)
- Additional accommodation costs incurred due to the child (and accompanying person)
- Childcare
- “Participation” in the conference for the child (and accompanying person)

During the conference:

- ☐ Access for parents with strollers: Ensure that parents with strollers have access to all areas.
- 640 ☐ Family events: Offer events for families (e.g., excursion to a playground).
- ☐ Children's tables in presentation rooms: Provide tables in presentation rooms for older children, where they can do homework, draw, or solve puzzles during the presentations.
- ☐ Provide diapers and baby food: These can be offered, possibly for a small fee.
- ☐ Accessible changing tables: Ensure that changing tables are accessible to everyone.
- 645 ☐ Nursing rooms: Provide rooms specifically for nursing.
- ☐ Family rooms: Offer rooms designated for families.
- Detail what facilities are available in these rooms.
- Ensure these rooms are open at all times.

- Provide workspaces for parents or even the possibility to stream presentations from these rooms.

650

- Offer toys for different age groups.

- ☐ ~~Education Series~~ Promote mutual exchange on balancing family and academic work: Organize a series of events on the topic of balancing family and academic work, and highlight networks/websites/support services available.

- ☐ Free access for accompanying persons: Accompanying persons should be able to enter the conference venue free of charge to take care of the child/children.

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- ☐ Childcare services: Provide details about childcare services, including:

- Specify the times during which childcare is available.

- Indicate the age groups that can be cared for.

- Specify the language(s) in which childcare is provided.

- Clarify any costs involved for parents.

660

- ☐ Ensure that the childcare services are in accordance with the session schedule

- ☐ Offer the possibility of online conference participation, and consider expanding online networking opportunities.

After the conference:

- ☐ Feedback on family-friendliness: Give parents the opportunity to provide feedback on the family-friendliness of the conference, for example, through a survey that is promoted via email.

As part of this research, our project also set a focus on the organizational side of family-friendly conferences, to explore whether family support options are feasible. While some organizers of smaller conferences (100 to 600 participants) reported that the interests of parents are too low to undertake high organizational efforts for implementing family support, other conferences such as the European Geoscience Union General Assembly (EGU GA) or the Goldschmidt conference offer family support options since several years. In the following the offers implemented by EGU GA are discussed. The EGU GA is Europe's largest geoscientific conference with approximately 20,000 participants attending each year. It is held at the Austria Center in Vienna during spring. With respect to family-friendliness, the conference provides a considerable amount of support and infrastructure for caregivers and their families (Fig. B1). Information for parents is available through EGU blog posts, where experiences are shared (e.g., Gibson (2020) about parenting at the EGU GA 2020), parents can find practical advice (e.g., Steffen (2022) provides tips for attending the conference with kids) and attention is given to family-friendly initiatives in the geoscientific field (e.g., Christine Liang and Tahnee Prior (2025) about parenting in field-based research, Päßgen (2024) about family-friendly conferences). Additionally, the conference provides information on their website and an email address as a direct point of contact for parents with questions or difficulties. While the EGU GA does not feature a family and children-oriented program directly, it does incorporate discussion on work-family balance and similar sessions. Networking events for parents are available as pop-up events that might vary from year to year and the EDI reception is intended to be family-friendly. Furthermore, the EGU Early Career Scientists have a "Life, Careers & Wellness" group which handles topics like work-life balance, including parenting. One of the participants in our survey shared a positive experience that underlines the importance and success of these measures: "I actually doubted that having kids would fit in an academic career, because I had no examples around me of people doing it! Then I joined EGU 2019, where they had an entire session about parenthood in academia, eye opener."

The EGU GA is fully hybrid, such that all sessions can be attended online. The infrastructure at the conference site includes changing tables, rooms for families and childcare facilities. Nearby the conferences center, families can find playgrounds such as the Playground of Continents and the Sparefroeh-Spielplatz. Furthermore, the EGU GA publishes EGU coloring books for children of different ages (Gibson, 2024). Financial support for parents is provided through waived fees for children under the age of 18 and childcare free of charge. However, parents or caregivers that accompany the children need a paid registration. Carers of children under the age of three are free of charge, in cases where attendance is only to assist the participation of geoscientist parents. Overall, compared to many other scientific meetings, the EGU GA demonstrates a strong commitment to foster a family-friendly atmosphere and to support parents and families. However, there remain opportunities to expand the family-friendly programming and the financial assistance. Additionally, the EGU as an organization should consider to publish a statement about family-friendly policies in geoscientific research. It should be noted that this level of family support requires substantial organizational and financial resources and is often not possible for smaller, volunteer run conferences. The organization is also more complex for conferences that always take place in a new location and may have a different team responsible for organizing each event. It is plausible, that the EGU GA benefits from its annual occurrence in the same location and the fact that childcare has been offered for several years. Parents might share information about the support options at the



European Geoscience Union

Family Support at the
General Assembly

Family-Friendly Infrastructure at the Conference Venue

Online participation: **Available**
Changing tables: **Available**
Rooms for families: **Available**
Childcare facilities: **Available (Without costs for parents)**
Playgrounds near the conference center: **Available:**
Playground of continents / Spurefroh-Spielplatz in the nearby
Donaupark

Financial Support

Availability of financial support for
families/parents: **Not directly available**
Children under the age of 18 are free of charge
but must be accompanied by a legal parent or
guardian with a paid registration.
Carers of children under the age of 3 are free of
charge, in cases where attendance is only to assist
the participation of geoscientist parents.

Contact Information

Point of contact for parents with questions or
difficulties: egu24@copernicus.org,
egu25@copernicus.org (number changes with the
year)

Family-Friendly Program

Sessions/events/activities
specifically designed for parents,
children, or families: **Not available**

Sessions/presentations addressing
the academia-family conflict or
similar topics: **Available**

Networking events for parents:
Available as pop-up events (varies
year to year), also EDI reception
intended to be family-friendly

Online Resources

Accessibility information

https://www.egu24.eu/about/accessibility_and_inclusiveness.html

Blogs

<https://blogs.egu.eu/geolog/2020/02/19/accessibility-at-egu-parenting-at-the-general-assembly-yes-to-the-creche/>

<https://blogs.egu.eu/geolog/2022/05/06/how-to-egu22-tips-for-attending-the-conference-with-kids/>

<https://blogs.egu.eu/geolog/2024/04/12/the-new-egu-colouring-books/>

Additional Information

The EGU Early Career Scientists
have a "Life, Careers & Wellness"
group which handles topics like
work-life balance, including
parenting.

Figure B1. Overview of the support options offered at the EGU GA, as presented on the “Family-friendly conferences in the geosciences” project website (Päffgen, 2024). The information is based on publicly available resources and details provided by the EGU GA organizers; completeness and accuracy cannot be guaranteed.

conference in their personal networks, which leads to a greater visibility of these offers over time. This assessment is based on publicly available information and information provided to us by the conference organizers. Therefore, it might not capture the full range of experiences and initiatives present at the conferences. Research focused on the evaluation of the feedback of parents concerning the EGU GA is needed to fully examine the success of these measures.

Appendix C: Survey questions

705 We present the questions of the online survey, the response options, question format and target group as well as the number of answers n received for each question in two tables: Tab. C1 lists the questions for demographic information of the survey participants and Tab. C2 lists all other questions.

Table C1. Questions regarding the demographic characteristics of the survey participants

Question	Response Options	Question Format	Target Group	n
How old are you?	<15, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, >74	Single Choice	All participants	236
What gender do you identify with?	Male, Female, Non-binary, Other	Single Choice	All participants	236
By which of these status groups do you feel best described?	Student, PhD, Post-Doc, Lecturer, Staff member, Employed at a university, None	Multiple Choice	All participants	241

Table C2. Survey questions

Question	Response Options	Question Format	Target Group	n
At which of these conferences have you already participated in?	EGU, AGU, Ocean Sciences, Other, None	Multiple Choice	All participants	243
Which other conferences have you attended so far?	-	Free Text Field	All participants	156
How many conferences and workshops do you typically attend in a year?	0,1,2-3,3-5,>5	Multiple choice	All participants	240
Do you have children?	Yes, No	Filter Question	All participants	245
How old is your child?	<3,3-6,7-10,11-15,16-18,>18	Multiple choice	Parents	141
How important is a hybrid offering to you at conferences and similar events?	very important, important, relatively unimportant, unimportant	Single choice	Parents	141
Who takes care of your children when you are at a conference?	Partner, Parents, Relatives, Friends, Babysitter, Other, No one	Multiple choice	Parents	139
Have you ever been unable to attend a conference because of your children?	Yes, No	Single Choice	Parents	140
Have you ever taken your kids to a conference?	Yes, No , I would like to, I would not like to	Multiple choice	Parents	134
Which of these offerings-offers might help you at conferences and similar events?	Changing Tables, Rooms to Breast-feed, Playgrounds, Activities, Childcare, Networking, Other, None	Multiple Choice	Parents	139
What would you wish for to increase a family-friendly environment on conferences or workshops?		Free Text Field	Parents	66
Do you generally feel well-informed about support offerings-offers for families from the organizers of conferences?	strongly agree, agree, disagree, strongly disagree	Single Choice	Parents	143
Do you think that having children is a disadvantage for a scientific career?	strongly agree, agree, disagree, strongly disagree	Single Choice	All participants	222
Do you feel disturbed by children at conferences and similar events?	strongly agree, agree, disagree, strongly disagree	Single Choice	All participants	226
Do you feel that conferences and similar events are designed to be family-friendly?	strongly agree, agree, disagree, strongly disagree	Single Choice	Non-parents	103
Do you think the range of family-oriented offerings-offers at conferences should be expanded?	strongly agree, agree, disagree, strongly disagree	Single Choice	Non-parents	101
Do you have any ideas on how to better integrate children and families into conferences and similar events?		Free Text Field	Non-parents	34
Would you participate in an initiative to showcase your research to children at the conference?	strongly agree, agree, disagree, strongly disagree	Single Choice	Non-parents	102

Appendix D: Categories from the inductive category formation

710 The following table (Tab. D1) summarizes the results from the inductive category formation following Mayring and Fenzl (2019). Figure D1 shows the intercode agreement of the categorization performed by two different persons deducing the four main categories “Financial Support”, “ Awareness”, “Clear Communication and Transparency” and “Family-Friendly Infrastructure” from the free text answers of the parents in this study to the question “What would you wish for to increase a family-friendly environment on conferences or workshops?”. The category “Family-Friendly Infrastructure” includes five subcategories (1.1 to 1.5). The percentage in which the categories are addressed in the comments of the parents is shown in Fig. D2.

Table D1. Categories from the inductive category formation

Category Name	Category Number	Absolute Count	% of SUM
Financial Support <u>Hybrid events</u>	2	<u>4</u>	<u>3</u>
<u>Financial Support</u>	<u>3</u>	29	26
Awareness	3 <u>4</u>	9	8
Clear Communication and Transparency	4 <u>5</u>	4	3
Family-Friendly <u>Family-Friendly</u> Infrastructure			
Possibilities for exchange and networking for parents	1.1	2	1
Events, where children are explicitly welcomed.	1.2	7	6
Family-friendly event schedule	1.3	10	9
Childcare/rooms explicitly designed for families.	1.4	26	23
—Hybrid events 1.5 4 3-height			

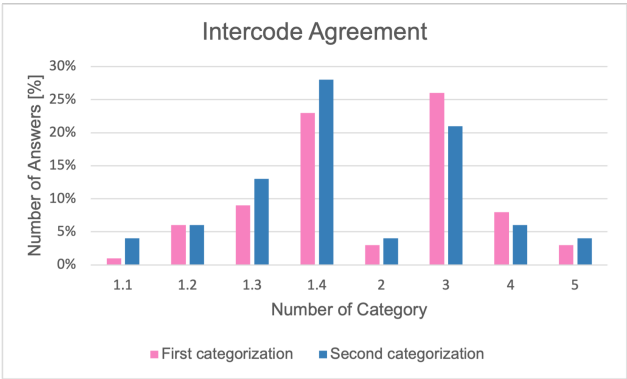


Figure D1. Results of the intercode agreement check. Results of the inductive category formation by Elena Päßgen in blue and the results of Sylvia Brückner in orangepink.

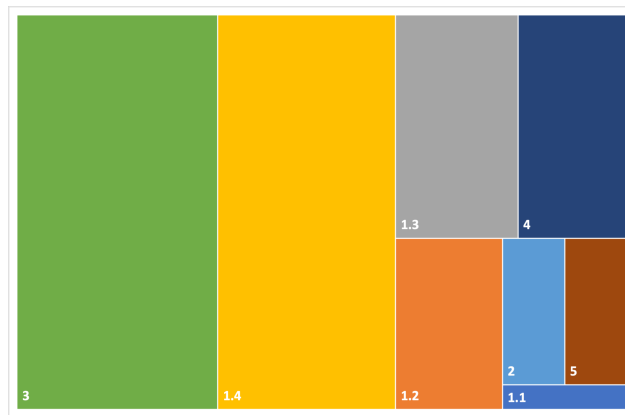


Figure D2. Hierarchy plot of the named categories of parents.

715 *Author contributions.* EP: Writing - Original Draft, Visualization, Formal analysis, Methodology, Investigation; LS & LE: Conceptualization, Writing - Review & Editing, Supervision, Funding acquisition

Competing interests. We declare that no competing interests are present.

Ethical Considerations. This study was categorized as a low risk study by the Ethics Committee at the Faculty of Medicine Bonn who concluded that there are no ethical or legal concerns to be raised.

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