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How do children, adolescents, and young adults relate to climate change? Implications for developmental psychology

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ABSTRACT

Climate change is an existential threat facing humanity on a global scale. To handle this problem, all societal actors, including young people, need to get involved. This narrative review focuses on what implications climate change has for research in developmental psychology. It is argued that how young people relate to climate change is closely associated with key issues dealt with in this research field. The aim of this article is to present an overview of research about young people and climate change concerning four interrelated topics: (a) climate change and mental well-being, (b) coping with climate change, (c) private-sphere pro-environmental behaviour as a form of pro-social development, and d) climate change and political socialization. The emphasis is on young people from middle childhood to early adulthood. Implications for future research are discussed, for instance, the need for more longitudinal and intervention studies.

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Climate change is an existential threat with global consequences. Climate scientists agree that we as humans, especially those of us living in the Global North, are causing this problem through our lifestyle and how we have arranged society (see IPCC, 2021). Therefore, it is important that all societal actors take responsibility to fight climate change. Young people are one important stakeholder group since it is their future that is at risk. Furthermore, young people are the future leaders and decision-makers of society, and it is therefore important that they develop competences to deal with this complex problem (Periera & Freire, 2021). Young people are also citizens of today who can both worsen this problem through an

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unsustainable lifestyle and help improve the problem by acting in as climate friendly a manner as possible in everyday life, influencing their parents and friends, and putting pressure on politicians through political protest (O'Brien et al., 2018). In addition, climate change can be seen as a psychological threat in the sense that it could lead to declining mental well-being among young people (Sanson et al., 2019). This does not just apply to those who face climate-change-related degradation directly but also to those who encounter this problem indirectly through, for example, media, school, and discussions with friends and parents (Sanson et al., 2019). All these aspects show that climate change is also of interest for psychology researchers, and not least for developmental psychologists.

The aim of this article is to summarize some research about young people, mainly in the age groups of mid-childhood to early adulthood, and climate change and to discuss implications for developmental psychology. The focus is on research about negative climate-change emotions, coping, and mental well-being and on studies exploring factors that are important for climate-change engagement. This article is not a systematic review, but a narrative review (see Collin & Fauser, 2005) that indicates vital and emerging areas of research that could be of interest to developmental psychologists. Issues that touch upon key topics in developmental psychology, like coping, mental well-being, positive youth development, pro-social behaviour, and political socialization, will be discussed. Studies about young people and other environmental issues, for example, local environmental problems, will not be reviewed, although sometimes, when important for the aim of the study, they will be mentioned briefly.

The reason to concentrate primarily on the specific age groups mentioned above is that late middle childhood (ages about 11–12) is a period when many children start showing an interest in wider societal and global issues (Holden, 2007). This could be due to developmental factors related to the fact that many children in this age-group develop a capacity for abstract thinking, that is, that they can think beyond a concrete situation (Evenshaug & Hallen, 2001). Also, there are not many studies about younger children and climate change (see Sanson et al., 2019). The oldest age group in focus in this article is emerging adults, that is, young people in the late teenage years and early adulthood (see Arnett et al., 2001). This age period is of interest because it has, at least in the Global North, been seen as a period for exploration where, for example, young people's connection to the broader society is developed further and in a more

independent way (Arnett et al., 2001). Thus, this could be a critical age period for continuing climate engagement in adulthood and therefore is included in the group 'young people' (see also Nash et al., 2020).

Climate-change worry and mental well-being

It is well known that the onset of mental ill-being peaks in adolescence, and this is a topic that many developmental scientists work with (see Solmi et al., 2021). A research study performed in different countries showed that adolescents and emerging adults (ages 16 to 25) worry a lot about climate change and that they feel betrayed by the adult world concerning this problem (Hickman et al., 2021). Those who lived in countries that have already been hit hard by climate-related catastrophes were also the ones that worried the most. The fact that many young people experience climate worry has led psychology researchers to ask whether negative emotions concerning this problem could also lead to reduced general mental well-being in this age group. It has been shown in many, foremost qualitative, studies that this is the case regarding children, adolescents, and emerging adults who experience direct weather-related catastrophes or gradual climate-related degradation, threatening ways of living and the place where they live (for a review, see Ojala et al., 2021; Sanson et al., 2019). Often these young people live in the Global South or belong to groups of indigenous people. Thus, climate change is already a psychological stressor for many young people.

What, then, does the relation between negative emotion about climate change and mental well-being look like among children, adolescents, and emerging adults, who primarily encounter climate change indirectly through, for example, media and school and who live primarily in the Global North? Not many studies have been performed thus far, and most are quantitative survey studies of a cross-sectional type, which precludes capturing in which direction the influence goes (for a review, see Ojala et al., 2021). These studies show mixed results, where sometimes there are positive associations between climate-change worry and general measures of negative emotional states, like general depression and anxiety (Ogunbode et al., 2021; for a review, see Ojala et al., 2021). However, there are also studies and sub-studies that show no relation between worry about climate change and general well-being where the focus is mostly on cognitive measures of life satisfaction (for a review, see Ojala et al., 2021). That climate-change anxiety is positively related to measures of

general distress but not related to measures of life-satisfaction, was also supported by a recent study with emerging adults (ages 18 to 26) from the Philippines (Reyes et al., 2021). In addition, a study involving emerging adults in different countries found positive associations between climate distress and sleeping problems (Ogunbode et al., 2021).

Recently, an eight-year longitudinal study starting with data collection in the ages 10–11 and using a person-centred approach has been published. The study found that the young people who persistently, over time, worried a great deal about climate change also had high rates of depressive symptoms in late adolescence (ages 18–19) in comparison to a group who over time was moderately worried about this problem (Sciberras & Fernando, 2021). However, another group, with increasing climate-change worry, did not score comparatively high on general depression in late adolescence, indicating that climate-change worry does not drive depressive symptoms. Perhaps, a third variable like a personality factor could explain the identified association between consistent climate-change worry and general depression. Unfortunately, due to the design of the study, whether this is the case, or, for example, whether depression[1] rather drives climate-change worry, was not possible to investigate.

Positive youth development: Coping with climate change and mental well-being

Another key topic for developmental psychologists is research about how to promote well-being and enhance life chances for young people (Lerner et al., 2003; Periera & Freire, 2021). Periera and colleagues performed a review of studies that have applied a positive youth development (PYD) framework to the climate-change problem (Periera & Freire, 2021). They found that none of the studies mentioned PYD but that they all explored concepts that are of importance in this framework, like agency, system thinking, positive connection to parents through communication, and coping. Their recommendation was that researchers who are interested in how young people relate to climate change could benefit from assuming a PYD perspective because its holistic and integrative approach deals with well-being and engagement simultaneously and could therefore help in the two-

[1]General depression was only measured in the last wave of data collection.

fold purpose of promoting climate engagement at the same time as well-being is preserved, or even enhanced. A focus on climate change could also offer new perspectives to the research field of PYD.

Studies aiming to identify factors that could potentially buffer climate-change worry from leading to low well-being are few. Ojala (2005) explored associations between worry about global environmental problems, including climate change, among a group of late adolescents (mean-age 17.5) using a person-oriented approach. Two groups of highly worried adolescents were identified, one group that was high on well-being and one that was low on well-being. The group that was high on well-being also scored higher on meaningfulness, hope, and anger, as well as trust in environmental organizations. Both social trust and meaning and purpose have been found to be associated with positive youth development, well-being, and social engagement (Damon et al., 2003; Flanagan, 2003). In addition, eco-anger has been shown to predict well-being and is argued to be a possible sign of that not all responsibility for this problem is placed on young people's own shoulders but that they also demand that more powerful actors take responsibility (Stanley et al., 2021).

In two studies with children (ages 11–12) and adolescents (ages 16–18), meaning-focused coping in relation to climate change was positively related to all aspects of subjective well-being (Ojala, 2012a, 2013). In this context, meaning-focused coping consists of both an ability to switch perspectives between focusing on the grave prospects related to this problem and positive aspects like the fact that more and more people are taking climate change seriously nowadays (positive-reappraisal), but also to invest trust in different societal actors. Some young people also use a kind of defiant hope, where they are rather pessimistic but force themselves to feel hope (Ojala, 2012b). From a developmental psychology perspective, it is also interesting that there seem to be age differences regarding meaning-focused coping, where a younger age group, 11–12-year-olds, used less meaning-focused coping in the form of positive reappraisal than older age-groups, which could be due to the fact that this strategy is complex and requires mature cognition that many in the younger age-group do not yet have (Ojala, 2012b). The youngest age group, on the other hand, experienced more trust in science than the older age groups, and they also felt more hopeful overall, perhaps because they do not yet understand the complexity and graveness of climate

change as late adolescents and emerging adults more often do. Age differences like these are of vital interest for developmental psychologists and should be investigated further in future studies.

Two additional factors that could hinder climate-change worry from turning into low well-being are collective engagement and nature contact. One study with emerging adults (ages 18–35) showed that being collectively engaged regarding climate change attenuated the positive relationship between climate-change anxiety and general depression symptoms (Schwartz et al., 2022). In a review paper, the possible complex relationships between climate-change worry, nature connection, and mental well-being were elaborated on (Chawla & Gould, 2020). Nature contact could possibly buffer the relationship between climate-change worry and general negative affect, but it could also increase negative affect because of a realization that nature could be destroyed due to climate change. More empirical studies on this topic are needed.

Positive youth development: Private sphere climate-change engagement

Because there is a need for all actors to become involved in fighting climate change, it is important to investigate what factors can enhance young people's private-sphere climate engagement, which is one aspect of pro-environmental behaviour. Pro-environmental behaviour can be seen as a form of prosocial behaviour (see Otto et al., 2021), and this topic has long been of interest to developmental psychologists, not only because it is important for society to hold together but also since it is related to good adjustment and well-being (Gomez-Baya et al., 2020).

Regarding predictors of private-sphere pro-environmental behaviour among young people, climate-change worry is one factor that is consistently positively related to being more engaged (Galway et al., 2021; for a review, see Ojala et al., 2021; Sanson et al., 2019). One mediating factor in this relationship is problem-focused coping, where people cope by focusing on the problem and searching for information (Ojala, 2012b). This way of coping is present among both adolescents (ages 16–17) and children (ages 11–12), although less commonly among the youngest age group, perhaps because this age group is still restricted by their parents (Ojala, 2012a, 2013). In addition, meaning-focused seems to be positively associated with pro-environmental behaviour (see Ojala, 2012a, 2013; Ojala & Bengtsson, 2019). Emotional intelligence in the form of emotional management and control and the ability to understand other people's

emotions also had a positive association to pro-environmental behaviour among a group of 12–17-year-olds (Robinson et al., 2019). Other factors that seem to be constructive for private-sphere climate engagement and that could be of interest for developmental psychologist are values of an other-oriented character and a feeling of outcome efficacy (Collado & Evans, 2019; Corner et al., 2015). These are factors that are of interest in developmental psychology research about political socialization, for example, (Sherrod et al., 2010).

Children's relationship to their parents is also of pivotal interest to developmental psychologists. A longitudinal study ranging from childhood to the age of 18 years showed that one important factor for engagement concerning global environmental problems in emerging adulthood was that one's parents (mothers) had environmentally friendly attitudes and were active concerning environmental issues (Evans et al., 2018). Communication patterns with parents of a solution-oriented and respectful kind are also positively related to pro-environmental behaviour (Galway et al., 2021). In one study, the influence from parents was mediated by the late adolescents' own coping strategies in relation to climate change (Ojala & Bengtsson, 2019).

Young people, in turn, also influence their parents' concern about climate change (see Grønhøj, 2007). An experimental study about a climate-change program in school, aimed at a group of 14-year-olds and with an intergenerational-learning component included, showed that parents of the children in the experiment group, compared to the control group's parents, became increasingly concerned about climate change over the intervention (Lawson et al., 2019). The authors interpreted the results to mean that the parents became more concerned due to being inspired by their children. There also seem to be mutual bidirectional parent–child influences. One qualitative study showed complex interactions and negotiations around conflicts between late adolescents (ages 16–19) and their parents regarding behaving pro-environmentally in the household (Collins, 2015).

Developmental psychologists also acknowledge the influence of friends, which is often especially strong during adolescence. Friends do play an important role in influencing young people's climate change interest and engagement, although parents still seem to be the most important socialization agent regarding these issues (for a review, see Corner et al., 2015).

A longitudinal study found that childhood contact with nature is important for the development of pro-environmental behaviour and interest in global environmental problems in emerging adulthood (Evans et al., 2018). That nature contact/connection is related to pro-environmental behaviour has also been found in cross-sectional studies with different age groups of young people (Otto & Pensini, 2017; for reviews, see Matsuba & Pratt, 2013; Chawla & Gould, 2020). According to Matsuba and Pratt, the developmental mechanisms explaining this relationship could be, for example, that nature interaction leads to the development of cognitive schemas and scripts focused on the natural environment, but also to formation of an emotional attachment to nature, factors that can be generalized to global problems through, for example, education as the young people mature. These experiences are also argued, through narratives about the self, to lead to an identity that incorporates environmental issues (Matsuba & Pratt, 2013).

Cognitive development could play a role regarding how young people in late adolescence and early adulthood cope with the complex character of changing their everyday behaviours in a more climate-friendly direction. The complexity, ambivalence, and low outcome efficacy felt in relation to climate change can be coped with in a black-and-white manner, where the young people, for example, claim that unless everyone behaves pro-environmentally there is no point in them doing anything. This kind of reasoning is associated with less engagement (Ojala, 2022; Ojala & Anniko, 2020). However, there are others who use a kind of deontological moral reasoning where the young people argue that they want to do the right thing and what others do is not important for their decision (Ojala, 2022; Ojala & Anniko, 2020). If the social domain theory, in the moral development subfield, is applied, this could indicate that not behaving pro-environmentally is perceived as a moral transgression that is not acceptable (see Smetana, 2005). In addition, some young people use a kind of dialectical thinking, acknowledging both the benefits and the downsides of, for example, climate-friendly food choices but transcend the gap with a third element, such as by arguing that 'I can at least be a role model for others' or 'someone has to take the first step' (Ojala, 2022; Ojala & Anniko, 2020). Dialectical thinking could be seen as a form of postformal thinking, that is, a stage of cognitive development that goes beyond formal thinking and that some persons, particularly in emerging adulthood, develop and that could be essential for dealing with complex

matters such as climate change (Labouvie-Vief, 2006). This approach to climate-friendly behaviours is rather new and needs to be investigated further in future research.

Positive youth development: Climate change and political socialization

In recent years, more traditional forms of political engagement in relation to climate change, like demonstrations and school-strikes, have been led primarily by young people, mostly adolescents and emerging adults. This has prompted researchers to explore what factors could explain whether young people will be collectively engaged concerning climate change. Some studies have focused on the importance of significant life experiences for life-span development into exceptional environmental engagement (Chawla, 1999; Chawla & Gould, 2020; Howell & Allan, 2016). Often using a qualitative life-story approach, this research has found that positive contact with nature in childhood, especially continual and intensive interaction, is important (Chawla, 1999; Matsuba & Pratt, 2013). However, climate change is not only an environmental problem but also a societal problem, and nature experiences in one study seemed to play a less important role for climate engagement (Howell & Allan, 2016). Other-oriented values and justice were more important instead. In addition, role models, such as environmentally engaged parents but also teachers, seem to matter a great deal (Chawla, 1999; Chawla & Gould, 2020; Howell & Allan, 2016; Matsuba & Pratt, 2013).

There are also studies investigating factors that characterize adolescents and emerging adults who are collectively engaged in new climate-change movements like Fridays for Future. Emotions of anger, which are seen as approach emotions, have been found to be prominent among climate strikers and activists (Kleres & Wettergren, 2017; Martiskainen et al., 2020). However, an interview study with climate strikers in four countries showed that the most prominent feeling also in this context was fear (Martiskainen et al., 2020), which is supported by two quantitative survey studies (Brugger et al., 2020; Cologna et al., 2021). The feeling of being able to do something about climate change (outcome-efficacy, response efficacy) when joining together and protesting in a collective way was also emphasized by the young people (Martiskainen et al., 2020; Wallis & Loy, 2021) and found to be vital also in a quantitative study (Cologna et al., 2021).

A quantitative study with young climate protesters (ages 13–25) showed that in comparison with a group not especially active in the climate-change movement, these protesters were more inclined to say that they had friends who were involved in climate movements, that they identified with other climate activists, and also that they had stronger personal environmental norms (Wallis & Loy, 2021). Another study involving university students, that is emerging adults, in Switzerland with Fridays-for-Future demonstrators compared them to a group that was not involved and showed that trust played an important part in their engagement, but in a slightly different way than developmental researchers interested in general political socialization have emphasized as important (Cologna et al., 2021). Young climate protestors actually evinced a low level of trust in politicians but a high level of trust in climate scientists. However, it is hard to say whether the factors identified in these studies are drivers of the engagement, owing to the designs of the studies. Also, this field is new and rather diffuse. In addition, these studies are quite a-theoretical and could benefit from taking into account integrating theories from the field of political socialization (see Sherrod et al., 2010).

Future studies and conclusion

This narrative review shows that the matter of how children, adolescents, and young adults relate to climate change represents potentially interesting research topics for developmental psychologists. This is a rather new research field, especially the focus on mental health and climate change, and more studies need to be performed. Concerning mental health and climate change, there is a need for more longitudinal studies that can yield insights into what the complex relationships between, for example, climate-change worry and well-being look like. If possible, these studies should also include parents. It is also essential to conduct more quantitative studies with young people living in the Global South. Investigating how different subgroups of youth, minority groups, and immigrant youths, for example, relate to this problem is also important. It could also be valuable to perform in-depth studies of how climate change affects young people's everyday life by, for instance, using real-time methodologies such as Experience Sampling Method. Comparative studies of young people living in different countries/cultures and more studies with younger children are also needed.

Regarding promoting well-being and climate engagement among young people, more intervention studies are needed in different contexts, for example, in schools and families. In this regard, theories from research in PYD can be of great use (see Periera & Freire, 2021). In addition, the rather a-theoretical research about why some people become engaged in climate change organizations and in school strikes and protests related to Fridays for Future could benefit from taking into account theories from developmental psychological research in political socialization. For example, trust is a concept that has been found to be important concerning societal engagement in general (see Flanagan, 2003). Smetana has found that encountering conflicts and dealing with them can be an important part of developing pro-social engagement that is resilient (Smetana, 2005). Research about how young people cope with conflicts related to trying to behave in a more climate-friendly manner in a not-always-so-sustainable society can most probably benefit from taking account of these developmental psychology studies. PYD research could also benefit from taking into account the benefit of nature contact for positive youth development in general. Finally, regarding the relationship between climate change and both mental well-being and engagement, specific age-related aspects would be interesting to explore from a developmental psychology perspective. Today, the studies are too few to claim anything general about age differences and how young people relate to climate change.

To conclude, assuming a developmental psychological perspective both in a theoretical and empirical way could benefit the research field of young people and climate change. Developmental psychology has long worked with topics that are of importance also when it comes to young people's relation to climate change, like pro-social development, political socialization, positive youth development, what causes mental ill-being among young people, and how to promote psychological well-being. However, developmental psychology as a research field could also benefit and advance by considering climate change and how young people relate to this problem.

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References

Arnett, J. J., Ramos, K. D., & Jensen, L. A. (2001). Ideological views in emerging adulthood: Balancing autonomy and community. *Journal of Adult Development*, *8* (2), 69–79. https://doi.org/10.1023/A:1026460917338

Brugger, A., Gubler, M., Steentjes, K., & Capstick, S. B. (2020). Social identity and risk perception explain participation in the Swiss youth climate strikes. *Sustainability*, *12* (24), 10605. https://doi.org/10.3390/su122410605

Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education*, *31*(1), 15–26. https://doi.org/10.1080/00958969909598628

Chawla, L., & Gould, R. (2020). Childhood nature connection and constructive hope: A review of research on connecting with nature and coping with environmental loss. *People and Nature*, *2*(3), 619–642. https://doi.org/10.1002/pan3.10128

Collado, S., & Evans, G. W. (2019). Outcome expectancy: A key factor to understanding childhood exposure to nature and children's pro-environmental behavior. *Journal of Environmental Psychology*, *61*, 30–36. https://doi.org/10.1016/j.jenvp.2018.12.001

Collin, J. A., & Fauser, B. (2005). Balancing the strengths of systematic and narrative reviews. *Human Reproduction Update*, *11*(2), 103–104. https://doi.org/10.1093/humupd/dmh058

Collins, R. (2015). Keeping it in the family. *Geoforum*, *60*, 22–32. https://doi.org/10.1016/j.geoforum.2015.01.006

Cologna, V., Hoogendoorn, G., Brick, C., & Uttley, J. (2021). To strike or not to strike? An investigation of the determinants of strike participation at the Fridays for Future climate strikes in Switzerland. *PLoS ONE*, *16*(10), e0257296. https://doi.org/10.1371/journal.pone.0257296

Corner, A., Roberts, O., Chiari, S., Völler, S., Mayrhuber, E. S., Mandl, S., & Monson, K. (2015). How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators. *WIREs Climate Change*, *6*(6), 523–534. https://doi.org/10.1002/wcc.353

Damon, W., Menon, J., & Cotton Bronk, K. (2003). The development of purpose during adolescence. *Applied Developmental Science*, *7*(3), 119–128. https://doi.org/10.1207/S1532480XADS0703_2

Evans, G. W., Otto, S., & Kaiser, F. G. (2018). Childhood origins of young adult environmental behavior. *Psychological Science*, *29*(5), 679–687. https://doi.org/10.1177/0956797617741894

Evenshaug, O., & Hallen, D. (2001). *Barn- och ungdomspsykologi*. Studentlitteratur. *[Child, and youth psychology]*.

Flanagan, C. (2003). Trust, Identity, and Civic Hope. *Applied Developmental Science*, *7* (3), 165–171. https://doi.org/10.1207/S1532480XADS0703_7

Galway, L. P., Beery, T., Buse, C., & Gislason, M. K. (2021). What drives climate action in canada's provincial north? Exploring the role of connectedness to nature, climate worry, and talking with friends and family. *Climate*, *9*(10), 146. https://doi.org/10.3390/cli9100146

Gomez-Baya, D., Tomé, G., Branquinho, C., & Gaspar de Matos, M. (2020). Environmental action and PYD. Environmental action as asset and contribution of positive youth development. *EREBEA. Revista de Humanidades y Ciencias Sociales*, *10*, 53–68. https://doi.org/10.33776/erebea.v10i0.4953

Grønhøj, A. (2007). *Green girls and bored boys? Adolescents' environmental consumer socialization Children, media & consumption*. Nordicom, Göteborg. 319–333.

Sherrod, L. R., Torney-Purta, J., & Flanagan, C. A. Eds., (2010). *Handbook of research on civic engagement in youth*. John Wiley & Sons.

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, E. R., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Young people's voices on climate anxiety, government betrayal and moral injury: A global phenomenon. *Lancet Planetary Health*, *5*(12), e863–e873. https://doi.org/10.1016/S2542-5196(21)00278-3

Holden, C. (2007). Young people's concerns. In D. Hicks & C. Holden (Eds.), *Teaching the global dimension: Key principles and effective practice* (pp. 31–42). Routledge.

Howell, R. A., & Allen, S. (2016). Significant life experiences, motivations and values of climate change educators. *Environmental Education Research*, *25*(6), 813–831. https://doi.org/10.1080/13504622.2016.1158242

IPCC. (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. https://doi.org/10.1017/9781009157896

Kleres, J., & Wettergren, Å. (2017). Fear, hope, anger, and guilt in climate activism. *Social Movement Studies*, *16*(5), 507–519. https://doi.org/10.1080/14742837.2017.1344546

Labouvie-Vief, G. (2006). Emerging structures of adult thought. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 59–84). American Psychological Association. https://doi.org/10.1037/11381-003

Lawson, D. F., Stevenson, K. T., Peterson, M. N., Carrier, S. J., L. Strnad, R., & Seekamp, E. (2019). Children can foster climate change concern among their parents. *Nature Climate Change*, *9*(6), 458–462. https://doi.org/10.1038/s41558-019-0463-3

Lerner, R. M., Dowling, E. M., & Anderson, P. M. (2003). Positive youth development: Thriving as the basis of personhood and civil society. *New Applied Developmental Science*, *7*(3), 172–180. https://doi.org/10.1207/S1532480XADS0703_8

Martiskainen, M., Axon, S., Sovacool, B. K., Sareen, S., Furszyfer, D., & Axon, D. K. (2020). Contextualizing climate justice activism: Knowledge, emotions, motivations, and actions among climate strikers in six cities. *Global Environmental Change*, *65*, 102180. https://doi.org/10.1016/j.gloenvcha.2020.102180

Matsuba, M. K., & Pratt, M. W. (2013). The making of an environmental activist: A developmental psychological perspective. *New Directions for Child and Adolescent Development*, *142*(142), 59–74. https://doi.org/10.1002/cad.20049

Nash, N., Whittle, C., & Whitmarsh, L. (2020). *Rapid review of 'moments of change' and food-related behaviours*. Report commissioned by the Food Standards Agency UK.

O'Brien, K., Selboe, E., & Hayward, B. M. (2018). Exploring youth activism on climate change: Dutiful, disruptive, and dangerous dissent. *Ecology and Society*, *23*(3), 42. https://doi.org/10.5751/ES-10287-230342

Ogunbode, C.A., Pallesen, S., Böhm, G., et al. (2021). Negative emotions about climate change are related to insomnia and mental health: Cross-sectional evidence from 25 countries. *Current Psychology*. https://doi.org/10.1007/s12144-021-01385-4

Ojala, M. (2005). Adolescents' worries about environmental risks: Subjective well-being, values, and existential dimensions. *Journal of Youth Studies*, *8*(3), 331–348. https://doi.org/10.1080/13676260500261934

Ojala, M. (2012a). How do children cope with global climate change? Coping strategies, engagement, and well-being. *Journal of Environmental Psychology*, *32*(3), 225–233. https://doi.org/10.1016/j.jenvp.2012.02.004

Ojala, M. (2012b). Regulating worry, promoting hope: How do children, adolescents, and young adults cope with climate change? *International Journal of Environmental and Science Education*, *7*(4), 537–561.

Ojala, M. (2013). Coping with climate change among adolescents: Implications for subjective well-being and environmental engagement. *Sustainability*, *5*(5), 2191–2209. https://doi.org/10.3390/su5052191

Ojala, M., & Bengtsson, H. (2019). Young people's coping strategies concerning climate change: Relations to perceived communication with parents and friends and pro-environmental behavior. *Environment and Behavior*, *51*(8), 907–935. https://doi.org/10.1177/0013916518763894

Ojala, M., & Anniko, M. (2020). Climate change as an existential challenge: Exploring how emerging adults cope with ambivalence about climate-friendly food choices. *Psyke Og Logos*, *2*(2), 17–33.

Ojala, M., Cunsolo, A., Ogunbode, C., & Middleton, J. (2021). Anxiety, worry, and grief in a time of environmental and climate crisis. A narrative review. *Annual Review of Environment and Resources*, *46*(1), 35–58. https://doi.org/10.1146/annurev-environ-012220-022716

Ojala, M. 2022. Hope through learning to live with ambivalence: Emerging adults' agency work in the face of sustainability conflicts. In M. Häggström & C. Schmidt (Eds.),*Relational and critical perspectives on education for sustainable development. Belonging and sensing in a vanishing world*, (pp. 129-142). Springer. https://doi.org/10.1007/978-3-030-84510-0

Otto, S., & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global Environmental Change*, *47*, 88–94. https://doi.org/10.1016/j.gloenvcha.2017.09.009

Otto, S., Pensini, P., Zabel, S., Diaz-Siefer, P., Burnham, R., Navarro-Villarroel, C., & Neaman, A. (2021). The prosocial origin of sustainable behavior: A case study in the ecological domain. *Global Environmental Change*, *69*, 102312. https://doi.org/10.1016/j.gloenvcha.2021.102312

Periera, T., & Freire, T. (2021). Positive youth development in the context of climate change: A systematic review. *Frontiers in Psychology*, *23*(12), 786119. https://doi.org/10.3389/fpsyg.2021.786119

Reyes, M. E. S., Carmen, B. P. B., Luminarias, M. E. P., Mangulabnan, S. A. N. B., Ogunbode, C. A., Reyes, M. E. S., Carmen, B. P. B., Luminarias, M. E. P., Mangulabnan, S., & Ogunbode, C.:. A. (2021). An investigation into the relationship between climate change anxiety and mental health among gen Z filipinos. *Current Psychology*. https://doi.org/10.1007/s12144-021-02099-3

Robinson, L. C., Downey, L. A., Ford, T. C., Lomas, J. E., & Stough, C. (2019). Green teens: Investigating the role of emotional intelligence in adolescent environmentalism. *Personality and Individual Differences*, *138*, 225–230. https://doi.org/10.1016/j.paid.2018.10.009

Sanson, A. V., Wachs, T. D., Koller, S. H., & Salmela-Aro, K. (2019). Young people and climate change: The role of developmental science. In S. Verma & A. Petersen (Eds.), *Developmental science and sustainable development goals for children and youth. Social indicators research series* (Vol. 74, pp. 15–138). Springer.

Schwartz, S. E. O., Benoit, L., Clayton, S., Parnes, M. F., Swenson, L., & Lowe, S. R. (2022). Climate change anxiety and mental health: Environmental activism as buffer. *Current Psychology*. https://doi.org/10.1007/s12144-022-02735-6

Sciberras, E., & Fernando, F. W. (2021). Climate change-related worry among Australian adolescents: An eight-year longitudinal study. *Child and Adolescents Mental Health Journal*, *27*(1), 22-29. https://doi.org/10.1111/camh.12521

Smetana, J. G. (2005). Adolescent-parent conflict: Resistance and subversion as developmental process. In L. Nucci (Eds.), *Conflict, contradiction, and contrarian elements in moral development and education* (pp. 69–91). Erlbaum.

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2021). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*. https://doi.org/10.1038/s41380-021-01161-7

Stanley, S. K., Hogg, T. L., Leviston, Z., & Walker, I. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. *The Journal of Climate Change and Health*, *1*, 100003. https://doi.org/10.1016/j.joclim.2021.100003

Wallis, H., & Loy, L. S. (2021). What drives pro-environmental activism of young people? A survey study on the fridays for future movement. *Journal of Environmental Psychology*, *74*, 101581. article 101581. https://doi.org/10.1016/j.jenvp.2021.101581.