



Exploring the Impact of Weather on Outdoor Recess and its Effects on Children: A Scoping Review

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Abstract

Outdoor recess is a crucial part of the school day that provides students with opportunities to be active, connect with nature, and play. Certain weather events may impact activities during outdoor recess, or in more extreme circumstances, outdoor recess might be moved inside. The purpose of this scoping review is to explore the impact of weather on outdoor recess and outcomes that are related to children's wellbeing. Searches were executed in six databases. In total, 15 articles were retrieved. Findings indicate that physical activity is the most studied outcome, and certain weather conditions impact other variables related to children's health or well-being during recess. Future research is needed to understand the impact of weather on other health and well-being related factors.

Keywords: recess, child, weather, schools, health

Résumé

La récréation en plein air est une partie cruciale de la journée scolaire qui permet aux élèves d'être actifs, d'être en contact avec la nature et de jouer. Certains événements météorologiques peuvent avoir un impact sur les activités pendant la récréation en plein air ou, dans des circonstances plus extrêmes, la récréation en plein air doit se dérouler à l'intérieur. L'objectif de cette étude exploratoire est d'examiner les effets des conditions météorologiques sur les récréations en plein air et les répercussions sur le bien-être des enfants. Des recherches ont été effectuées dans six bases de données. Au total, 15 articles ont été retrouvés. Les résultats indiquent que l'activité physique est le résultat le plus étudié et que certaines conditions météorologiques ont un impact sur d'autres variables liées à la santé ou au bien-être des enfants pendant la récréation. Afin de mieux comprendre l'impact des conditions météorologiques sur d'autres facteurs liés à la santé et au bien-être, des recherches futures sont nécessaires.

Mots-clés : récréation, enfant, bien-être, météo, écoles, santé.

Introduction

In countries worldwide, recess is recognized as playing a critical role in social, physical, and mental wellbeing of children and youth (McNamara & PHE Canada, 2020; Murray & Ramstetter, 2013). Recess in elementary school is when children get a break from academic subjects and can go outside to relax, interact with friends from their class and other classes, spend time in nature, play creative games, and participate in different activities. During certain weather conditions, these activities might be disrupted, or in the most extreme circumstances, outdoor recess can be modified to be indoors to ensure the safety of all children. A review on weather and recess in Canada found that temperature and precipitation were common weather occurrences that would lead to recess being modified to be indoors (Button & Martin, 2023). Similar results have been found in the United Kingdom and the United States of America (Harrison et al., 2011; Jacobs, 2017). With one Canadian report estimating that there are almost 55 out of approximately 193 school days of indoor recess per year and many other days where outdoor recess occurs that have rain, snow, high winds, or heat, which may disrupt normal recess activities (Canadian Education Association, n.d.; Manitoba in Motion, 2018). Therefore, it is imperative that literature on weather and recess is synthesized.

The Canadian Society of Exercise Physiology suggests, children should accumulate 60 minutes per day of moderate to vigorous physical activity and limit sedentary time, specifically screen-based sedentary time (Tremblay et al., 2016). Evidence suggests that children who meet these guidelines have a better health-related quality of life (Marker et al., 2018), improved mental health (i.e., stress, depression) (Rodriguez-Ayllon et al., 2019), and lower cardiometabolic risk scores (Carson et al., 2016). Recess can be a critical time for physical activity. An overview of accelerometer-measured physical activity found that recess can contribute up to 40% of child's daily moderate to vigorous physical activity (Pulido Sánchez & Iglesias Gallego, 2021). During certain weather conditions, physical activity may be reduced as a systematic review and meta-analysis on weather and physical activity found lower temperature and rainfall were associated with lower physical activity (Turrisi et al., 2021). In the most extreme circumstances, during indoor recess, students are generally expected to stay in a classroom and play quietly (Canadian Rockies Public School, 2020). If a school does offer an opportunity to be active, it is normally considered light physical activity (Jacobs, 2017). This suggests that certain weather conditions can significantly decrease children's daily physical activity.

When children have outdoor recess, they can have increased access to nature. Increasing children's access to nature was recognized as essential for healthy child development by ParticipACTION, a Canadian non-profit organization that promotes healthy living (ParticipACTION, 2015). Systematic reviews have found that spending time in nature is related to healthy development, wellbeing and positive environmental attitudes (Gill, 2014) as well as improved mental health (Tillmann et al., 2018). Capaldi et al. (2015) provide three theoretical explanations for the benefits of nature. These explanation include biophilia which is a desire to be close to nature based on our ancestors living in more natural environments (Kellert & Wilson, 1993). Attention restoration theory which suggests that mental fatigue can be improved by spending time in or looking at nature (Kaplan & Kaplan, 1989), and stress-reduction theory which states exposure to natural unthreatening events is beneficial for stress reduction in comparison to urban environments (Ulrich et al., 1991). If outdoor recess is modified to be indoors, children could spend seven continuous hours or more inside per day without an opportunity to go outside. With research suggesting that 120 minutes per week in nature is associated with improved mental health and wellbeing and children spending increasing amounts of time engaging in screen time outside

of school, children should be given opportunities to experience nature throughout the school day (White et al., 2019).

Another potential benefit of recess is children can develop their social and emotional skills. During outdoor recess, children learn to use their interpersonal skills, think creatively, and react to the emotional needs of their peers as they discuss fair play, create new games, and share equipment (Ramstetter et al., 2010). Some of these opportunities are reduced during hot or cold periods because children can become lethargic or have poor behaviour which can lead to a deterioration of social activity (Vanos, 2015). In situations where recess is inside, children are expected to stay in their classroom and play quietly, typically on computers which may limit opportunities for social and emotional development (Canadian Rockies Public School, 2020).

Outdoor recess can have physical, social, and emotional benefits, but these opportunities can be reduced or even eliminated in certain weather conditions (i.e., heat, cold, rain, wind). This review aims to explore the impact of weather on outdoor recess and outcomes that are related to children's wellbeing. Understanding the current body of research will help assess the potential size and scope of the phenomena and determine possible avenues to move this research body forward.

Methodology

A scoping review was selected to identify available evidence on this topic (Munn et al., 2018). For this study, we have used the framework provided by Arksey and O'Malley, which consists of the following 5 stages: (1) identifying the research question; (2) identifying relevant studies to answer each specific topic within the research question; (3) study selection; (4) charting data; (5) summarizing and reporting of the results (Arksey & O'Malley, 2005).

Identifying the Research Question

The impact of weather on factors related to children's wellbeing is studied in the literature but not extensively reviewed in the school environment. This leads to the following research question: "What is the impact of weather on outdoor recess and outcomes related to children's wellbeing during school recess?"

Identifying Relevant Studies

This scoping review question consists of four major concepts: indicators of health and wellbeing (including physical activity, social and emotional wellbeing, and connection to nature), weather (in particular heat, cold, and rain), recess, and children and adolescents. The indicators of health and wellbeing were selected based on previous research on the importance of recess, health and wellbeing and interviews with schoolteachers and administrators (Janssen & LeBlanc, 2010; Ouellette et al., 2024; Rafferty et al., 2016; Schmitt et al., 2016). Published studies, editorials, commentaries, and opinion papers were included. This includes quantitative studies (i.e., cohort, cross-sectional, experimental), qualitative studies (i.e., action research, ethnography, grounded theory), and mixed method studies. Since recess in many countries is subject to extreme weather conditions, there were no inclusion or exclusion criteria based on geographic region. However, studies were limited to articles published in English within the last 20 years. Potential studies also include educators' perceptions of weather during outdoor recess. Studies on designing playgrounds for extreme weather, on play/physical activity outside of school recess, and studies focusing on climate change were considered out of scope for this study.

As per Joanna Briggs Institute recommendations, initial searches were conducted in two major databases, ERIC and MEDLINE (Arksey & O'Malley, 2005). Table 1 presents the search strategy for the ERIC database, and this was adapted as much as possible to other databases. Results set from these searches were used to identify additional keywords and to adjust search parameters to increase search precision. The strategy was then adapted to four more databases: Web of Science, Google Scholar (first 200 results), PsycINFO, and SportDiscus. A reverse search of references cited in the studies that met the inclusion criteria and a reference search of a new book titled *The Impact of Extreme Weather on School Education* (Hyndman & Vanos, 2023) was also conducted. This search strategy was developed by a research librarian (IF) in collaboration with the lead author (BB).

Table 1
Scoping Review Strategy for ERIC

Search Number	Search Term
S1	(NOFT("student behavior" OR "student behaviour") OR ("childrens attitudes" OR "student attitudes"))
S2	(NOFT("social connectedness" OR "social connection" OR "social connections" OR "social environment" OR acculturation))
S3	(NOFT("physical activities" OR "physical activity" OR "recreational activities" OR "physical environment" OR "recess break*" OR playground*))
S4	(NOFT("mental health" OR well-being OR well-being OR wellness OR "emotional response" OR "psychological patterns" OR "adjustment to environment" OR "life satisfaction" OR "quality of life" OR "social-emotional health" OR happiness OR "self-esteem" OR "self-concept" OR "body image" OR "physical appearance" OR anxiety OR depression))
S5	(NOFT("time in nature" OR "connection to nature" OR "sensory experience" OR "environmental influences"))
S6	S1 OR S2 OR S3 OR S4 OR S5
S7	(NOFT(weather))
S8	(TI,AB(rain OR snow OR heat OR wind OR freez* OR cold))
S9	S7 OR S8
S10	(NOFT(child*) OR (kid*) OR (adolescent*) OR (teen*) OR (youth) OR ("young people") OR ("school children")) OR (schoolchildren*) OR (("school age" OR "school-aged" OR "school ages")) OR (school-age*))
S11	S6 + S9 + S10

NOFT: Stands for no full text. This searches for the words in the entire record, excluding full text. It helps to avoid irrelevant results that happen to mention the terms within the full text.

: Is a truncation command that will search for the word as written plus any other letters after. For example, child will find child, children, children's, childhood.

TI,AB: Is a command that specifically searches for the words only in the title and abstract. This command helps reduce irrelevant results like an author with the last name Snow.

Study Selection

After searches were completed, all citations were downloaded and uploaded into Zotero (Corporation for Digital Scholarship and Roy Rosenzweig Center for History and New Media, VA, USA), and duplicates were removed. After a pilot test with the larger research team, titles and abstracts were reviewed by two authors for inclusion using the systematic review collaboration software Rayyan (<https://www.rayyan.ai/>). Potentially relevant sources were retrieved in full and assessed against the inclusion criteria. Disagreements at any stage were solved through discussion or, if agreement could not be met, through consultation with a third reviewer. The search results and the study inclusion process are presented in Figure 1 using a format based on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

Charting the Data

Data were extracted following a data extraction tool developed by the authors based on examples from the Joanna Briggs Institute. Data were extracted by one author and confirmed by a second author. Information extracted included authors, year, participant age range and gender(s), number of participants, type of research, type of weather condition, study outcome, and, if applicable, school weather policy at the schools included in the study.

Collating, Summarizing, and Reporting the Results

Data is presented in a tabular and narrative format. The tabular charts give the extracted data, and the narrative synthesis aims to present a synthesis of the findings and explore relationships between studies.

Results

The search was executed in June 2022, and 5084 articles were retrieved. Three reviewers independently reviewed the titles and abstracts, and any disagreement was solved through discussion. In total, 12 articles met the inclusion criteria, and three additional articles were found through a reverse search (Figure 1). No additional articles were found after reviewing the reference list of a recently titled book *The Impact of Extreme Weather on School Education* (Hyndman & Vanos, 2023).

Articles' Characteristics

Table 2 provides the extracted data on the article characteristics. Of the 15 articles, 10 different countries were represented. Most articles were from Australia (n=4). Other represented countries/regions include England and Denmark (n=2), as well as the United Kingdom, Finland, Sweden, the United States of America, New Zealand, Estonia, Canada, and Spain (n=1 for each country/region). One article included participants from Denmark and New Zealand. Articles were published between 2006 and 2020. The ages of participants in the studies ranged from 5 to 16 years, and all studies focused on children except one on educators. Ten articles used quantitative approaches. Seven of these studies focused on physical activity as the primary outcome measure. The three other quantitative studies focused on health-related quality of life, beliefs towards play in cold weather, and enjoyment. In the quantitative studies, rainfall, cloud coverage, snow, temperature, and season were all explored. Similarly, all five qualitative studies focused on physical activity. In the qualitative articles, researchers explored barriers, perceptions, or beliefs about play or physical activity during outdoor recess, and weather was identified as a theme, code, or area of interest.

Figure 1
PRISMA Flow Chart of Article Identification and Selection

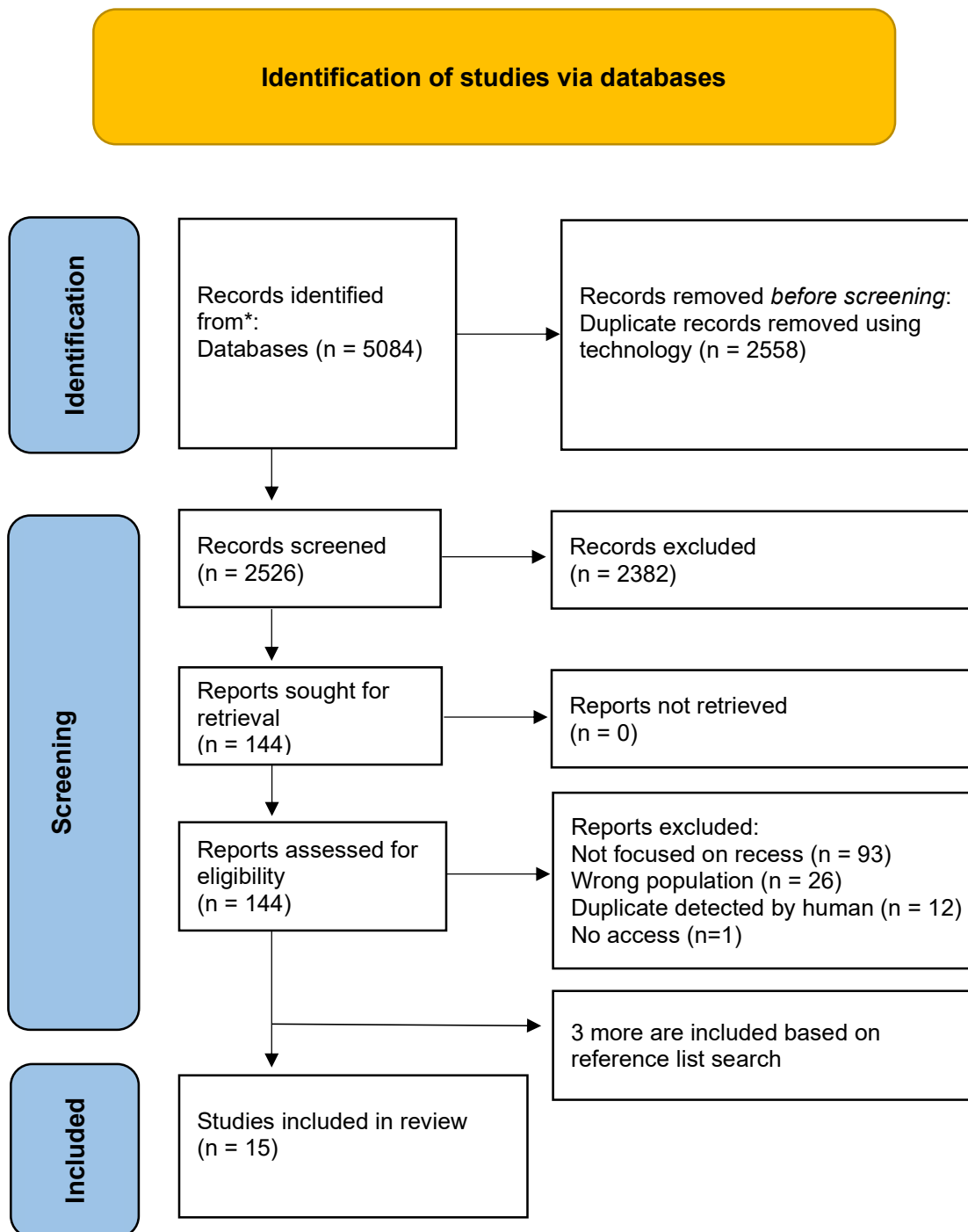


Table 2
Characteristics of Selected Studies on Weather and Recess

Author and Year	Country	Participants		Quantitative /Qualitative	Concept What weather condition is being examined? (How is it measured)	What is the outcome variable? (How is it measured or data collection tool)
		Age	Gender			
(Button et al., 2020)	Canada	8-14 years	55 girls / 34 boys	Quantitative	Temperature, snow, rain (government reporting station)	Physical activity (accelerometer)
(Eskola et al., 2018)	Finland	8-9 years	14 girls / 8 boys	Qualitative	Not applicable	Factors that schoolchildren identify as impacting physical activity during the school day (photo-elicitation and interviews)
(Hannus et al., 2018)	Estonia	8-16 years	56 girls / 36 boys	Qualitative	Not applicable	Barriers and facilitators to recess physical activity (focus groups)
(Harrison et al., 2011)	UK	9-10 years	986 girls / 808 boys	Quantitative	Rain (government reporting station)	Physical activity (accelerometer)
(Hughes et al., 2017)	USA	Admin, educators, & teachers working with students 5-8 years	92 No gender breakdown reported	Quantitative	Beliefs about the benefits of cold weather	Beliefs about benefits of outdoor play and cold weather (survey)
(Hyndman et al., 2017)	Australia	8-12 years	63 girls / 42 boys	Quantitative	Weather conditions (student perception measured through a survey)	Health-related quality of life (survey)
(Hyndman & Telford, 2015)	Australia	9-13 years	27 girls / 27 boys	Qualitative	Not applicable	Student perceptions of playground safety on physical activity (focus group)
(Hyndman et al., 2015)	Australia	8-12 years	50 girls / 30 boys	Quantitative	Season autumn, winter, winter, spring (measurement timepoint)	Enjoyment of physical activity (survey)
(Pagels et al., 2016)	Sweden	7-14 years	87 girls / 92 boys	Quantitative	Season, cloud coverage and precipitation (observation), temperature (government reporting station)	Physical activity (accelerometer)

(Pawlowski et al., 2018)	Denmark /New Zealand	10-13 years	66 girls / 61 boys	Qualitative	Not applicable	Understand factors affecting recess physical activity (participant observation, go-along group interviews and participatory photo interviews)
(Pawlowski et al., 2014)	Denmark	10.4 years	58 girls / 53 boys	Qualitative	Not applicable	Gender differences in children's perceptions of barriers during recess (focus group, go-along interview, aerial photos, and Post-it note activity)
(Pérez-Trabazo et al., 2020)	Spain	5 years	9 girls / 9 boys	Quantitative	Rain (government reporting station)	Physical activity and steps (Garmin fitness tracker)
(Ridgers et al., 2018)	Australia	8-11 years	164 girls / 162 boys	Quantitative	Season winter, spring, summer, autumn (measurement timepoint)	Physical activity (accelerometer)
(Ridgers et al., 2010)	England	9-10 years	90 girls / 62 boys	Quantitative	Temperature (portable standard thermometer)	Physical activity (System for Observing Children's Activity and Relationships during Play)
(Ridgers et al., 2006)	England	6-11 years	19 girls / 15 boys	Quantitative	Season summer vs winter (measurement timepoint)	Physical activity (heart rate monitor)

Narrative Summary

The findings of each article are provided in Table 3. There is some evidence that weather had an impact on children's physical activity during recess. On days with rain, decreases in moderate to vigorous physical activity ranged from 9.4 to 15 minutes (Harrison et al., 2011; Pérez-Trabazo et al., 2020). The impact of temperature on children's physical activity during school recess appears complex and variable, with studies showing positive and negative relationships between temperature or season and physical activity. Outside of physical activity, one study found evidence that playing in cool or warm conditions increased health-related quality of life (Hyndman et al., 2017). Finally, a study that surveyed educators and administrators that focused on outdoor play and cold weather found positive perceptions towards play in cold weather, but there was variability in answers based on educators in formal vs informal settings (Hughes et al., 2017). When studies collected information on weather, this was done through governmental websites (Button et al., 2020; Harrison et al., 2011; Pérez-Trabazo et al., 2020), subjective surveys or perception (Hughes et al., 2017; Hyndman et al., 2017), time of year (Hyndman et al., 2015;

Ridgers et al., 2006, 2018), objective on-site equipment (Ridgers et al., 2010), or a combination of these tools (Pagels et al., 2016).

Table 3
Main Findings of Selected Studies on Weather and Recess

Author and Year	Findings	Policy
(Button et al., 2020)	For each 1°C increase in maximum daily temperature, children were getting 14 more seconds of daily MVPA. Rain had no impact. Average mean temperature for the study period was 8.9°C.	No clear policy for weather and recess.
(Eskola et al., 2018)	Having appropriate clothing for the weather and certain weather conditions (bright and sunny) was important for recess physical activity, and different seasons afforded different games like 'snow games' and 'puddle tag.'	No clear policy for weather and recess.
(Hannus et al., 2018)	Unsuitable weather was described as something that would decrease physical activity. Specifically, worry about getting sick.	No clear policy for weather and recess.
(Harrison et al., 2011)	Relative to days with no rain, children spent 9.4 minutes fewer in moderate to vigorous physical activity and were sedentary for 13.6 more minutes on the wettest days. Children allowed to play outside in wet weather had the lowest lunchtime physical activity, being less active than those allowed to be active inside.	Head teachers selected one of the following policies that best matched their school. <ol style="list-style-type: none"> 1) All children play outside regardless of weather. 2) In good weather children play outside, but in bad weather children stay indoors. 3) In good weather children play outside, in bad weather children get a choice to play inside or outside. 4) Children can play inside or outside regardless of weather. 5) All children play inside regardless of weather.
(Hughes et al., 2017)	Differences exist in beliefs towards cold weather and temperature threshold between different parties in the educational community.	Temperature cut-offs.
(Hyndman et al., 2017)	Playing outside in a range of warm and cold weather conditions can predict Health-Related Quality of Life.	No clear policy for weather and recess.
(Hyndman & Telford, 2015)	Weather protection was important to be physically active at schools.	No clear policy for weather and recess.

(Hyndman et al., 2015)	Cool and warm conditions impacted children's enjoyment of physical activity during school breaks. Children enjoyed physical activity more in March when the mean maximum temperature was 22.9°C when compared to points later in the school year when temperatures ranged from 10.0°C to 19.3°C.	No clear policy for weather and recess.
(Pagels et al., 2016)	Less physical activity during inclement weather.	No clear policy for weather and recess.
(Pawlowski et al., 2018)	Children, particularly girls, did not enjoy playing outside in either rain or snow. Children were not allowed in certain areas during rainy days.	Children were required to play outside all year, children could decide themselves, and children were unable to use parts of the playground in certain weather conditions.
(Pawlowski et al., 2014)	Bad weather conditions as a main barrier to recess. Children reported it was not fun to play in rain or snow, stopped them from using certain facilities, and did not motivate them.	Children could decide, children were unable to use parts of the playground in certain weather conditions, access to sports inside.
(Pérez-Trabazo et al., 2020)	Statistically significant differences were found for both moderative physical activity and steps with children being more active on days without rain.	No clear policy for weather and recess.
(Ridgers et al., 2018)	No significant changes during recess in different seasons. However, children engaged in less moderate and vigorous physical activity during lunchtime in spring and summer compared to winter. In the spring, the average temperature was 19.1°C; in summer, the average temperature was 23.7°C and in the winter, 13.7°C.	No clear policy for weather and recess.
(Ridgers et al., 2010)	Temperature was negatively associated with vigorous PA. $\beta=-0.65$ (95% CI -1.20 to -0.10 $p=0.02$) and temperatures ranged from 12°C to 27°C.	No clear policy for weather and recess.
(Ridgers et al., 2006)	No significant variations in physical activity in different seasons, with average temperatures in the winter of 10°C and 19°C in the summer.	No clear policy for weather and recess.

Qualitative research explored children's perceptions of play or physical activity during recess. Studies used data collection techniques, including focus groups (Hannus et al., 2018; Hyndman & Telford, 2015), photo-elicitation interviews (Eskola et al., 2018), go-along group interviews, and gender-segregated Post-it notes activities (Pawlowski et al., 2014). All studies found that weather was identified as an important consideration for outdoor activities. For example, when the students discussed weather, they suggested that "rainy or snowy" weather were not fun to play in and stopped them from using courts or fields (Pawlowski et al., 2014) or that children had a fear of getting sick from playing in the cold (Hannus et al., 2018). In a study that used a photo-elicitation methodology and interviews, the weather was identified as a factor

influencing physical activity in school. However, in this study, some of the benefits of different weather conditions were identified, including 'snow games' or 'puddle tag' (Eskola et al., 2018). In articles using both quantitative and qualitative data, there were few studies that described the specific policies, practices, or procedures used for weather and school recess. The studies that did report temperature related policies included temperature cut-offs (Hughes et al., 2017), or having children go outside regardless of weather, stay inside regardless of weather or allowing children to choose (Harrison et al., 2011; Pawlowski et al., 2018). Similar limitations were reported across all articles, including small sample sizes, region-specific studies, and temperature or rain measurements coming from a regional weather reporting station rather than sensors of the micro environment of the school yard.

Discussion

This review aimed to explore the impact of weather in the context of outdoor recess and how this relates to children's wellbeing. We found some evidence that weather impacts recess activities and factors related to wellbeing, specifically physical activity. Future research must explore other health and wellbeing-related concepts such as connection to land or nature, interactions with peers, time to relax and restore, sedentary time, and joy/pleasure to help determine best policy and practices for addressing weather conditions during school recess.

Physical activity is the most explored variable when examining weather and school recess. Only two empirical studies examined a variable outside of physical activity, and both found a relationship between weather and either quality of life or enjoyment (Hyndman et al., 2017; Hyndman et al., 2015). It is essential to explore variables outside of physical activity because a study on young children found increases in humidity effect frustration, sadness, and aggression (Ciucci et al., 2011). If children go outside and play in warm temperatures during recess and then go immediately to a warm classroom, it may impact their irritability and ability to learn. Recess has purported benefits on time spent in nature, social and emotional learning, and social connection. Future research is needed to explore how weather and recess impact other variables related to children's wellbeing and how the experiences in different temperatures impact classroom behaviours.

The relationship between weather, outdoor recess, and physical activity appears to be highly nuanced and variable. Participants described different reasons for weather as barriers to being active, including it not being fun to be out in the cold (Pawlowski et al., 2014), students worried about getting sick (Hannus et al., 2018), concerns about the school getting dirty, or certain play areas being closed because of the bad weather (Pawlowski et al., 2018). Participants also described the affordances that different weather systems could provide (Eskola et al., 2018). The variability was also found in quantitative research, as one study found a positive relationship between temperature and physical activity (Button et al., 2020), while another study found that temperature was negatively associated with vigorous activity (Ridgers et al., 2010). This difference could be explained by the temperature ranges used in each study. It could also be related to the relationship between temperature and activity. A study by Turrisi et al. (2021) on out-of-school physical activity found that the relationship between temperature and activity may resemble an inverted U and the temperature will eventually get too warm or cold and activity will decrease. These findings highlight the complex and context-dependent nature of how weather influences outdoor recess and physical activity, indicating the need for nuanced strategies to promote outdoor play in varying weather conditions.

This review did not specifically search for articles on weather and school policies, but this information was extracted to help explain the findings. For example, Harrison et al. (2011) used five policy options that helped contextualize and add depth to their results. Children who were allowed to play outside in wet weather accumulated less physical activity than those allowed to be active inside. This suggests that the policy allowing children outside in all weather conditions might be having unintended impacts on physical activity. Button and Martin (2023), Jacobs, Hansen, Nightingale and Lehnard (2019) have explored policies for indoor recess, and both found that there were differences between policies used at the school level. A potential explanation for these differences could be linked to the community culture around the outdoors. For example, in Finland children will commonly nap outdoors in winter with some parents allowing their children to sleep outside in temperatures as low as -27°C which is a temperature where some Canadian schools will not even allow children outside for recess (Button & Martin, 2023; Tourula et al., 2008). Understanding school policies, practices, and procedures for weather and recess are important for two primary reasons. First, differences in school policies may impact children's perceptions of play in poor weather. If children know they are not allowed to go outside in certain weather conditions at school, it may change their feelings toward playing outside in extreme weather outside of school. Second, it is important to understand best practices for weather and recess.

Limitations

The authors aimed to use a comprehensive search, which included six databases and an examination of reference lists, but there is a possibility that relevant articles were missed. Specifically, the authors used an English language inclusion criteria and focused on only peer-reviewed publications. These decisions were based on the time constraints of the study.

Conclusion

In summary, this scoping review provides insight into the impact of weather on school recess and, subsequently, how this relates to school children's health and wellbeing outcomes. From the current literature, physical activity is the most commonly studied outcome in studies that examine weather related recess changes and seems to decrease due to certain weather conditions. However, it is pertinent that other outcomes (i.e., time in nature and social and emotional wellbeing) are explored, as recess is essential for more than just physical activity. In addition, exploring why some children enjoy playing in different weather conditions while others avoid it and exploring teachers' attitudes and comfort integrating play in different seasons may provide valuable insight into preparing students for outside play in various weather conditions.

Acknowledgments

This project was funded by a Major (17131) and Discretionary Grant (16678) from the University of Winnipeg.

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