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A systematic review of disability's treatment in the active school travel and children's independent mobility literatures

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ABSTRACT

While various forms of social difference (e.g. gender, age, race/ethnicity, and class) have been engaged in the active school travel (AST) and children's independent mobility (CIM) literatures, one form has gone largely unconsidered: disability. Disregard for disability within these literatures is troubling, as it leaves children's experiences of disability associated with independent mobility and school travel unquestioned, which in turn helps to allow their experiences of exclusion to persist. This paper presents a systematic review of the AST and CIM literatures that was undertaken with a view to providing insight into three questions. (1) To what extent is disability considered in the literatures in comparison to other forms of social difference? (2) How is disability engaged? (3) How could disability be approached differently such that experiences of children (and their households) living with disability are better accounted for moving forward (e.g. provided with equitable travel/mobility options)? Following a detailed consideration of the systematic review process, this paper presents figures and tables showing the extent to which disability has been considered in the two literatures in relation to other forms of social difference. To show how transport scholars and others are engaging disability, 29 studies were identified for in-depth, qualitative review. These studies are summarized and then discussed in relation to their geographic focus, the forms of disability they considered, their treatment of children's perspective and agency, and the disability perspectives they employed. It is suggested that disability and its relationships with other forms of social difference, as well as the largely unquestioned normalcy of children's disability experiences, warrant further inquiry within the AST and CIM literatures. We propose that drawing upon a critical ableist studies perspective may be useful for any such inquiry due to its focus on ableism and normalcy, as well as its recognition of the complex intersectionality of disability experiences.

Introduction

While interest in children's independent mobility (CIM) has grown steadily since the early work of Mayer Hillman and colleagues (Hillman, Adams, & Whitelegg, 1990), it

can reasonably be said that this interest has spiked in recent years among transport scholars, policy-makers, and practitioners. Active school travel (AST), a field closely related to CIM, has also been subject to recent, heightened interest. CIM can be regarded as children's "freedom to travel around their own neighbourhood or city without adult supervision" (Tranter & Whitelegg, 1994, p. 265), and AST can be viewed as a child's trip to/from school using travel modes that are (semi-)independent and self-propelled (e.g. walking and cycling; McMillan, Day, Boarnet, Alfonzo, & Anderson, 2006). Increased attention to these fields has come about largely in response to widespread declines throughout the Global North in CIM (Barker, 2011; Mitra, Faulkner, Buliung, & Stone, 2014), AST (Active Healthy Kids Canada, 2014; Buliung, Mitra, & Faulkner, 2009; Evenson, Huston, McMillen, Bors, & Ward, 2003; Fusco et al., 2012, 2013; Larsen et al., 2012; Mammen, Stone, Buliung, & Faulkner, 2015; McDonald, 2007; Tranter, 2006), and children's physical activity levels (Buliung, Faulkner, Beesley, & Kennedy, 2011; Faulkner, Richichi, Buliung, Fusco, & Moola, 2010; Hillman, 2006); an increase in childhood overweight/obesity rates (Tremblay et al., 2010); and concerns about how these changes may add to longer term implications of an obesity epidemic (Hillman, 2006). In the context of these unsettling changes and concerns, school trips (i.e. the most regular daily travel practice of children) and, specifically, the advancement of AST have come to be widely regarded as an important opportunity for advancing CIM and physical activity levels, and gaining associated health and well-being benefits (Larsen, Gilliland, & Hess, 2012). This has resulted in AST policy contexts, which require evidence-based research.[1]

Researchers have striven to understand and advance AST by analysing obesogenic built environments, automobility, and traffic safety (Buliung et al., 2014; Wen et al., 2008; Whitzman, Worthington, & Mizrachi, 2010); how school site planning requirements and home-to-school distances affect school travel patterns (Larsen et al., 2012; Martin & Carlson, 2005; McMillan et al., 2006; Southworth, 2005); and how parents conceptualise childhood and safety risks, and make decisions about school travel and CIM (Faulkner et al., 2010; Holloway & Valentine, 2000; Malone, 2007). To a rather limited extent, they have also aimed to understand how various forms of social difference (e.g. gender (see Buliung et al., 2014; Hanson, 2010; Larsen et al., 2012; McMillan et al., 2006; Murray, 2009; Valentine, 1997), age (see Buliung, Sultana, & Faulkner, 2012; Mitra, 2013; Van Loon & Frank, 2011), race/ethnicity (see Malone & Rudner, 2011), and class (see Faulkner et al., 2010; Fusco et al., 2012; Malone, 2007)) influence school travel decisions and patterns. However, one form of social difference has largely been ignored: disability. Such neglect may be due to children with disabilities being viewed as too vulnerable to join general education classes, requiring protection, and in turn being excluded from these classes (Kavale & Forness, 2000). However, the increasingly common practice of mainstreaming (i.e. integrating) children living with disability into general education classes and environments makes it troubling to observe a disregard for disability in AST and CIM research and practice. Such disregard leaves children's experiences of disability during school travel unquestioned and allows negative dimensions of such experiences to persist.

This systematic review of the CIM and AST literatures was undertaken to better understand how disability is addressed in those related bodies of work. The review is constructed around three questions. (1) To what extent is disability considered in the literature in comparison to other forms of social difference? (2) How is disability

engaged? (3) How could disability be approached differently such that experiences of disabled children and their households are better accounted for moving forward (e.g. provided with equitable travel options)? To address these questions and provide necessary context, the following sections explain the review process, consider insights gleaned from literature search result totals, discuss issues concerning disability's treatment in the literatures, and suggest that employing a critical ableist studies (CAS; Goodley, 2014) perspective could be useful in CIM/AST research.

Review process

The review involved database searches of peer-reviewed articles published over the past 50 years (1966–2015).[2] The fields of AST and CIM are closely linked as AST patterns influence CIM practices, and vice versa; in turn, both AST and CIM literatures are considered to inquire into disability's treatment. Searches were conducted from January to March 2016, and were applied to Web of Science, Medline (via Ovid), PubMed, Scopus, and Sociological Abstracts (via ProQuest). Searches were applied to abstracts, titles, and keywords.[3] The authors developed various search functions by considering other articles' keywords and AST/CIM-specific search terms, using truncation and proximity[4] search operators, and applying Boolean operators and indexing language specific to each database. Three levels of search (i.e. primary, secondary, and tertiary) were conducted for both literatures across all five databases.

Primary searches conducted to identify the CIM and AST literatures were as follows:[5]

1.1. AST: ("school commut*" OR "transport* to school" OR "school travel" OR "school transport*" OR "school journey*" OR "journey to school" OR "walk* to school" OR "cycl* to school" OR "bik* to school") OR (school NEAR/3 ("transport-related physical activit*" OR "mode choice*" OR "active travel*" OR "active commut*" OR "travel behav*" OR "travel mode*" OR "mode* of travel"))

1.2. CIM: ("child* independent mobility" OR "child* mobility" OR "youth mobility" OR "CIM") OR (childhood* NEAR/3 (mobility)) OR (adolescen* NEAR/3 (mobility))

These search functions served as the foundation to secondary searches conducted to gain an insight into the extent to which disability has been engaged in the two literatures in comparison to gender, age, race/ethnicity, and class. Primary search function 1.2 was incorporated into the review in order to capture articles that are beyond, but related to the school travel literature (i.e. articles concerning CIM). Primary searches 1.1 and 1.2 were separately searched in conjunction (via an "AND" operator) with each of the following secondary search function add-ons specific to gender, age, race/ethnicity, class, and disability:

2.1. Gender: AND ("gender*" OR "boy*" OR "girl*" OR "male*" OR "female*")
2.2. Age: AND ("childhood*" OR "adolescen*" OR "teenage*" OR "adult*" OR "ageis*")
2.3. Race/Ethnicity: AND ("ethnic*" OR "race*" OR "raci*" OR "cultur*")
2.4. Class:[6]   AND ("class*" OR "socio-economic status" OR "socioeconomic status" OR "income*"
2.5. Disability: AND ("disab*" OR "impair*" OR "ableis*")

Search result totals (i.e. number of articles) for the 50 secondary searches[7] were recorded to facilitate comparisons of the varying degrees to which the five forms of social difference have been engaged. Inclusion/exclusion criteria were not incorporated into these search result total comparisons.

Tertiary searches were used to gain insight into how disability has been engaged in conjunction with other forms of social difference. These searches involved appending secondary search function 2.5 (i.e. the disability search) onto the other secondary searches using an "AND" operator. For example, the search used to consider the extent to which disability is engaged in conjunction with gender in the CIM literature was:

3.1. CIM + Gender + Disability: ("child* independent mobility" OR "child* mobility" OR "youth mobility" OR "CIM") OR (childhood* NEAR/3 (mobility)) OR (adolescen* NEAR/3 (mobility)) AND ("gender*" OR "boy*" OR "girl*" OR "male*" OR "female*") AND ("disab*" OR "impair*" OR "ableis*")

Search result totals for the 40 tertiary searches[8] were recorded so that they could be compared to consider the extent to which disability has been engaged in conjunction with the other forms of social difference in the literatures.

The authors recognise that comparing search result totals cannot flawlessly show the degree to which forms of social difference are considered/present in the literature. Instead, the search result totals are treated as general indicators of each social difference's presence in the literatures, which can be considered to draw comparisons to gain insight into saturations and gaps in research. Further, there are countless ways that such a project could be undertaken (e.g. differences in search terms, truncations and proximity search functions, search periods, databases searched, Boolean operators used to assemble search functions, as well as varied inclusion/exclusion criteria for the articles to be read). However, search functions were developed with care and applied consistently across databases in an effort to provide some insights into how disability is considered in the AST and CIM literatures in comparison to other forms of social difference.

Only articles from the disability-specific secondary searches (i.e. search functions 1.1 + 2.5 and 1.2 + 2.5) were collected, filtered through an inclusion/exclusion process, and reviewed in detail. To be included for review, an article had to meet the following criteria:

- Be written in English;
- Be published between 1966 and 2015;
- Be in a peer-reviewed, scholarly journal;
- Present primary quantitative, qualitative, or mixed-methods research;
- Concern research focused on the Global North;[9] and
- Concern research that involved child/youth/adolescent and/or parent participants (i.e. reviews and discussions of models/frameworks were excluded).

The 10 searches (2 searches × 5 databases) produced 490 references (105 for AST, 385 for CIM). Table 1 breaks down the 490 results by database:

Through the removal of duplicate references and an initial screening where the inclusion/exclusion criteria were applied to titles and abstracts, a total of 45 articles (16 AST, 29 CIM) were identified for further consideration. Through a second screening,

Table 1. Disability search result totals.

Database	AST	CIM	AST/CIM total
Web of Science	10	154	164
Medline	9	27	36
PubMed	2	36	38
Scopus	82	156	238
Sociological Abstracts	2	12	14
Total	105	385	490

Note: This breakdown does not account for removed duplicates.
Source: Prepared by authors.

where article bodies were searched/read to confirm the inclusion/exclusion criteria, it was determined that an additional 21 should be excluded, resulting in 24 articles (5 AST, 19 CIM). Following this process, one relevant AST article (Stephens et al., 2015) known to the authors that did not emerge in the search results (perhaps due to its recent December 2015 publication) was incorporated into the review. By reviewing the included articles' reference lists, four additional studies (see Anaby et al., 2014; Foley & McCubbin, 2009; Pivik, 2010; Pivik et al., 2002) were identified, screened, and included. A total of 29 articles (10 AST, 19 CIM) were identified and reviewed. Figure 1 provides an overview of the review process.

Results

Review results are presented in two forms: (1) a discussion of the search result totals from the primary, secondary, and tertiary searches and the insights they provide into how the
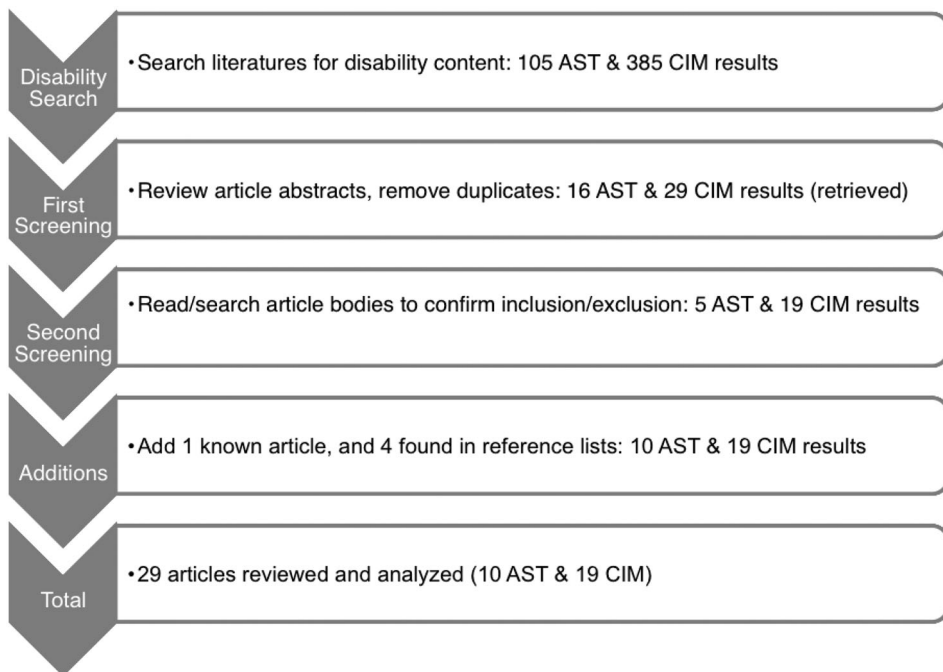

Figure 1. Overview of systematic review process. Source: Prepared by authors.

AST and CIM literatures consider disability; and (2) a qualitative review of the articles ident-ified through the disability-specific secondary literature searches.

Search result totals

For context, the primary search result totals used to identify the AST and CIM literatures are shown in Table 2, organised by database and by time period.

Finding markedly fewer references for AST (2,962) than CIM (13,208) is understandable since the former has a smaller scope and is generally a newer field, as indicated by the breakdown of the 50-year search period (i.e. 1966–1990 and 1991–2015). The 1966–1990 result totals for CIM and AST represent only 13.8% and 1.7% of their respective litera-tures over the 50-year search period. These data suggest that while little attention was paid to CIM prior to 1991, even less attention was given to AST.

The secondary search result totals suggest clear differences in the degree to which the five forms of social difference have been engaged in the literatures. Figure 2 suggests that gender and age are present in the AST and CIM research, race/ethnicity and class have a lesser but still somewhat substantial presence, and disability has largely been overlooked. These data suggest three distinct tiers of engagement with social difference in the litera-tures: (1) upper tier: significant attention paid to gender and age; (2) middle tier: somewhat substantial attention paid to race/ethnicity and class; and (3) lower tier: little attention paid to disability.

Table 2. Primary search result totals.

	AST			CIM		
Database	1966–1990	1991–2015	Total	1966–1990	1991–2015	Total
Web of Science	12	701	713	506	6433	6939
Medline	7	437	444	13	109	122
PubMed	1	125	126	44	393	437
Scopus	21	1549	1570	1206	4181	5387
Sociological Abstracts	9	100	109	53	270	323
TOTAL:	50	2912	2962	1822	11,386	13,208

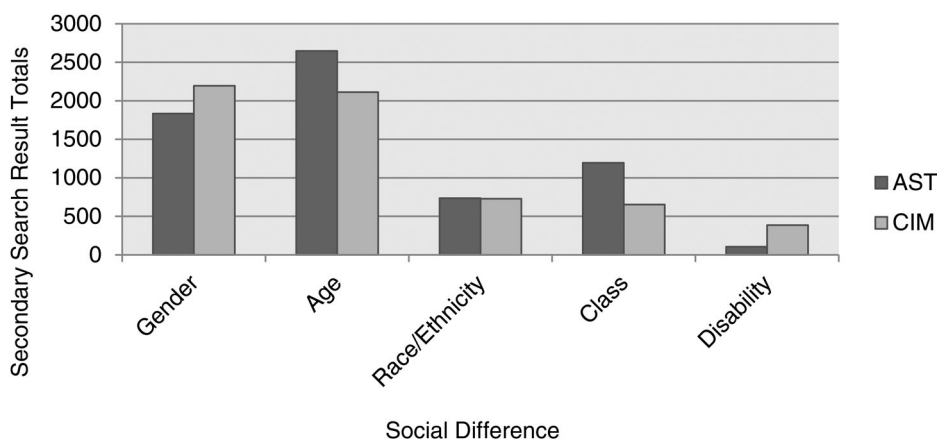Source: Prepared by authors.

Figure 2. Secondary search result totals by social difference. Source: Prepared by authors.

This tiered engagement suggests the presence of ableism within the AST and CIM literatures. Ableism can be viewed as a set of beliefs, processes, and practices informed by normative values that prioritise an idealised "species-typical" (see Campbell, 2009) human being,[10] which produces "favoritism for certain abilities [such as] cognition, competiveness or consumerism and the often negative sentiment towards the lack of favored abilities" (Wolbring, 2007, p. 1; in Goodley, 2014, p. 22). Through the normalised prioritisation of idealised abilities, such as walking or being ambulatory in general, ableism is "the system from which forms of disablism, hetero/sexism and racism emanate" (Goodley, 2014, p. 22).

Table 3 deconstructs search result totals for each form of social difference (i.e. the sum of result totals from all databases) into its presence (%) within the AST, CIM, and joint AST/CIM literatures. The data suggest disability has received remarkably little attention in AST and CIM research not only in comparison to other social differences, but also in relation to the literature overall (e.g. its 3.0% presence in the AST/CIM literature).

Gender and age should be continually considered in AST and CIM research as they are widely regarded to have notable influences on children's school travel patterns, mobility practices, and parenting approaches. However, it appears that more attention should be given to race/ethnicity, class, and especially disability. Further inquiry into disability (and also race/ethnicity and class) may help with uncovering how it affects and shapes children's transportation, and vice versa; identifying and addressing unrecognised issues; and developing new approaches to advancing AST and CIM that account for disability in terms of its experience and contribution to diversity. Such an inquiry could also help to implement existing disability-related AST/CIM policy directions that are at times ignored and thus not implemented.[11] Ideally, the types of social difference described here should be jointly considered in future research.

Figure 3 presents the tertiary search result totals by showing (1) a breakdown of the secondary search result totals for gender, age, race/ethnicity, and class in terms of their share (%) of the secondary search literature;[12] and (2) the presence (%) of disability. Percentages are based on the joint AST/CIM literature. The presence of gender, age, race/ethnicity, and class within the AST/CIM literature considering these social differences is 33.3%, 39.3%, 12.1%, and 15.3%, respectively. The tertiary search totals indicate that disability overlaps into 9.8%, 7.5%, 4.8%, and 7.5% of the AST/CIM literature concerning gender, age, race/ethnicity, and class, respectively.[13] Figures 4 and 5 show where disability overlaps with other forms of social difference in the AST and CIM literatures. When disability is considered in conjunction with social difference, it is most often considered in relation to gender and age, the two forms of social difference most frequently considered in these bodies of work.

Table 3. Presence of social difference in AST, CIM, and joint AST/CIM literatures.

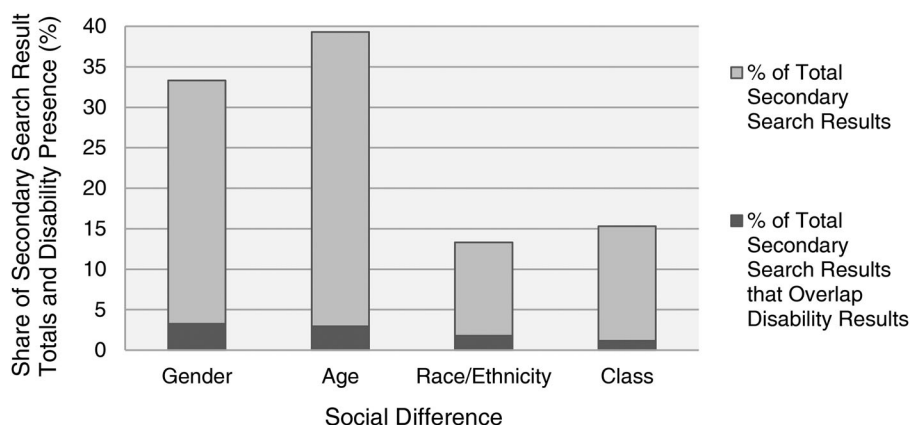| Social difference	AST (%)	CIM (%)	AST/CIM combined (%)
Gender	61.9	16.7	24.9
Age	89.4	15.9	29.4
Race/ethnicity	24.8	5.5	9.1
Class	40.3	4.9	11.4
Disability	3.5	2.9	3.0

Source: Prepared by authors.

Figure 3. Percentages of search result totals where forms of social difference are considered in conjunction with disability in the joint AST/CIM literature. Source: Prepared by authors.
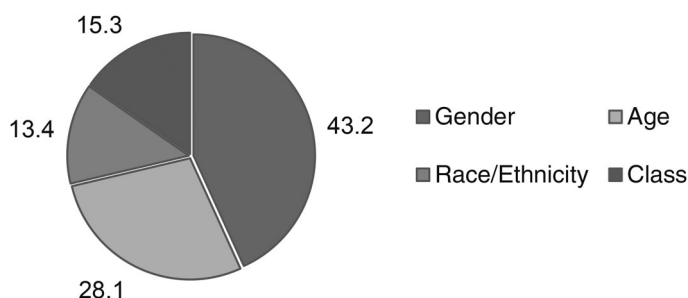

Figure 4. Where disability search totals overlap with other totals in the AST literature (%). Source: Prepared by authors.
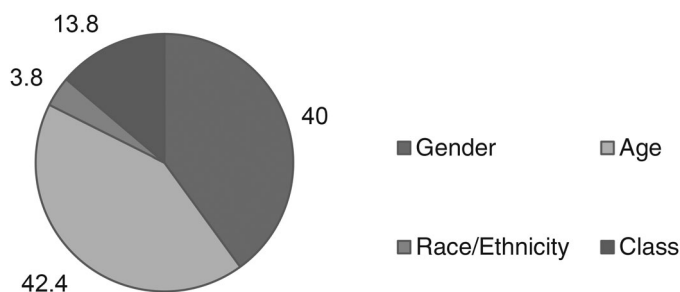

Figure 5. Where disability search totals overlap with other totals in the CIM literature (%). Source: Prepared by authors.

Figures 4 and 5 indicate that little research exists where disability is engaged alongside class (15.3% in AST; 13.8% in CIM) and especially race/ethnicity (13.4% in AST; 3.8% in CIM). Inattention to disability's intersection with class in these literatures is troubling, given that childhood disability can be remarkably costly for households in terms of time and money, and government support for medical/accessible services and technologies is at times

inadequate. Class and income/employment-related matters can contribute to the compounding of challenges for households without resources to manage the financial cost of some types of childhood disability. Further, economic challenges associated with disability experiences have been recognised as leading to the (re)inscription and deepening of class divisions (Erevelles, 2000). Inattention to disability's intersection with race/ethnicity is also troubling, given that "[b]eing white is historically contingent with being intelligent, civilized, and able", and that the elision of these two differences could help to direct/fix attention on the "dominant and symbolic elements of culture that mark people of colour and disabled people as Other" (Goodley, 2014, p. 44). These limitations suggest that it would be valuable to consider how disability experiences configure with those of race/ethnicity and class.

Review and discussion

To discuss disability's engagement in the 29 studies, four issues are considered: (1) geographic focus, (2) forms of disability considered, (3) children's perspectives and agency, and (4) disability perspectives. The CAS perspective is then discussed to explore how its use may help researchers to critically engage ableist elements within the normative ordering of transportation, mobility, and everyday life. Table 4 summarises the characteristics of the 29 reviewed studies.

Geographic focus

The vast majority of reviewed AST/CIM studies concerning disability emerged from two geographic areas: North America (13: 8 from Canada, 4 from the U.S.A.; 1 from both Canada and the U.S.A.) and the Nordic countries (12: 8 from Sweden, 3 from Norway, and 1 from Iceland). While this concentration was anticipated, its degree was not. The concentration clearly indicates that there are two key geographic areas where disability has been given attention in relation to AST and CIM. It was unexpected that searches would produce no primary disability-related AST/CIM studies from Australia or New Zealand that met the inclusion/exclusion criteria. The notable North American/Nordic focus in the literature indicates that there is a need for consideration of disability in AST/CIM research elsewhere in the Global North, and essentially everywhere else.

Forms of disability

The studies provide a range of findings[14] pertaining to the mobility, travel, health, and well-being of children with various forms of disability. These forms of disability include developmental (Falkmer, Anund, Sorensen, & Falkmer, 2004), cognitive (Falkmer et al., 2014), intellectual (Einarsson et al., 2015; Foley & McCubbin, 2009), sensory (Douglas, Pavey, Corcoran, & Clements, 2012; Porcelli, Ungar, Liebenberg, & Trépanier, 2014), and, most prominently, physical (Alriksson-Schmidt, Wallander, & Biasini, 2006; Stephens et al., 2015; Wiart, Darrah, Cook, Hollis, & May, 2003).[15] Many of the studies concerning physical disability focused specifically on children with cerebral palsy (CP; e.g. Ahl, Johansson, Granat, & Brogren Carlberg, 2005; Gibson et al., 2012; McKeever, Rossen, Scott, Robinson-Vincent, & Wright, 2013; see also Østensjø et al., 2005; Palisano et al., 2009; Soulis & Andreou, 2007; Van Wely et al., 2014; Wiart et al., 2003). This focus may be understood as a result of CP being the most prevalent motor disability in childhood (Østensjø,

Table 4. Characteristics of reviewed CIM and AST studies.

Study	Methods	Participants/location	Aim	Finding(s)
CIM				
Ahl et al. (2005)	Four-day family intervention; observe/measure physical testing	14 children (3F, 11M; 18 months–6 years) with spastic diplegia or tetraplegia/Sweden	Evaluate the effect of training in everyday life settings for preschool children with CP. Examine interventions' effects on parents' and assistants' perceptions of family centredness and competence in the care and training of their child.	Children with CP benefit from a functional goal-directed training approach in their development of gross motor function and everyday activities. Parents positively perceive ecological intervention.
Alriksson-Schmidt et al. (2006)	Questionnaire	159 adolescents (11–18 years) and parents/U.S.A.	Study the influence of life stress, social competence, family functioning, and peer social engagement on the quality of life (QL) in adolescents with mobility disabilities using a stress–resilience model.	Interventions to improve QL in adolescents with mobility disabilities may focus on reducing life stress and developing resilience by enhancing personal/social resources.
Douglas et al. (2012)	Large-scale social surveys	960 people with visual impairments/UK	Obtain and analyse participant-centred data from visually impaired people relating to their own interpretation of barriers they encounter.	Participants identified a range of barriers/enablers to mobility. Participants focusing on individually based explanations had more severe visual impairment. Professionals must not reinforce visually impaired people's perceptions of individual barriers and any associated sense of helplessness.
Gibson et al. (2012)	Face-to-face qualitative interviews	6 children with CP (9–18 years) and 6 parents/Ontario, Canada	Describe beliefs about the value of walking held by children with CP and their parents, and how such beliefs inform rehabilitation choices and perceptions of "success".	Parents try anything to be a "good" parent and maintain hope. They feel guilt/doubt about tapering of walking interventions. Children viewed walking as exercise, not functional. They internalised negative attitudes toward disability
Gürsel and Koruç (2011)	Questionnaire	58 adolescents (24F, 34M; 16–18 years); half had some form of acquired mobility disability (AMD)/Turkey	Determine if differences exist between adolescents with and without AMD regarding body image, and if physical activity influences these differences.	People with AMD evaluate their health and fitness levels as being lower than non-AMD adolescents. They are less concerned with fitness compared to non-AMD adolescents.
Hanisch (2011)	Case study; interviews	One 15-year-old female and her mother/Norway	Argue that rejection of Giddens in disability studies should cease because its use can be fruitful.	Disability studies should incorporate "Giddensian" strands of modernisation theory, rather than dismiss them.
Harper, Wacker, and Seaborg Cobb (1986)	Picture ranking test	358 non-disabled children and 60 children with physical impairments/U.S.A.	Assess disabled and non-disabled children's social preferences and acceptance towards visibly physically impaired peers.	The order of preference is a complex response and depends on several variables, including the type of disabilities present in the ranking, the sample tested, the social context of the task, and the type of questions asked.

Jemta et al. (2009)	Interviews; demographic analyses; use of Snoopy scale	138 children (7–18 years) with impaired mobility/Sweden	Consider the self-esteem of children/adolescents with mobility impairments. Analyse self-esteem and demographic data with disability characteristics. Identify the impact of 5 self-esteem dimensions on well-being and coping strategies.	Awareness of vulnerability factors for low self-esteem in children/adolescents with mobility impairments can offer healthcare professionals specific opportunities to enhance self-esteem in this group.
Jemta et al. (2005)	Interviews; demographics; motor capacity assessment	141 children (7–18 years) with impaired mobility/Sweden	Describe the well-being of children and adolescents with mobility impairments in relation to demographic data and disability characteristics.	No significant differences in well-being were found regarding the diagnostic-related group, additional disorder/disability, or the degree of disability. The impairment *per se* did not necessarily influence well-being negatively.
Jemta, Dahl, Nordahl, and Fugl-Meyer (2007)	Interviews; demographics; self-report inventory tool	133 children (7–18 years) with impaired mobility/Sweden	Evaluate a four-dimensional model of coping strategies that considers "active", "distraction", "avoidance", and "support-seeking" coping strategies.	The identification of coping strategies among children and adolescents with mobility impairments should form basis of our understanding of how they face complex challenges while growing up.
McKeever et al. (2013)	Structured, open-ended, one-hour interviews	20 parents of children with CP who received hands-free walker between 5 and 12.5 years/Ontario, Canada	Question how parents of children with CP value their children's ability to walk and its effects on rehabilitation.	Parents' symbolic value of a child having upright comportment may help explain their positive perception of hands-free walkers, and their motivation to devote time/effort to improving a child's independent, walking-based mobility.
Østensjø et al. (2005)	Cross-sectional	95 children (55M, 40F)/ Norway	Describe the use of assistive devices and environmental modifications, and their impact on everyday activities/care in young children with CP.	There is need for assistive technology assessments that consider the needs of child, family, and technology/service system factors.
Palisano et al. (2009)	14 interviews	10 adolescents (17–20 years) with CP/Ontario, Canada	Describe how youth with CP experience mobility in their daily lives using a phenomenological approach	Mobility was viewed as important for self-sufficiency, safety, and efficiency when making choices. Mobility preferences varied depending on social circumstance and environment. There is dissatisfaction with public transit, especially the need for constant planning before making trips.
Porcelli et al. (2014)	Qualitative, cross-cultural, visual methods approach	4 youth (14–16 years) with visual or auditory impairments/Quebec, Canada, and Guwahati, India	Explore the daily (micro)mobilities that youth with visual or auditory impairments use to sustain well-being.	Everyday patterns of (micro)mobilities can help to develop positive identities. More ecological or strength-based approaches are needed to recognise the resources of physically disabled youth and opportunities offered by environments.
Skär and Tamm (2001)	Semi-structured interviews	13 children/adolescents (8–19 years) requiring mobility aids/Sweden	Describe how children/adolescents with restricted mobility perceive their assistant with a focus on their relationships with one another.	Five perspectives of assistants were identified: assistant, mother/father, professional, friend, and the ideal. Establishing relationships with assistants is difficult and time-consuming.

(*Continued*)

Table 4. Continued.

Study	Methods	Participants/location	Aim	Finding(s)
Soulis and Andreou (2007)	Exploratory semi-structured interviews	16 women and 8 men (20–35 years) with CP since childhood/Greece	Question Greek social policy assumptions that families are the best and only providers to children and adolescents with impaired mobility.	Greek children with impaired mobility have limited life experiences due to development being hindered by over-attachment to family, which arises from dominant Greek cultural assumptions about family and parents.
Van Wely et al. (2014)	Implement, observe, and test a 6-month programme	49 walking children (28M, 21F; 7–13 years)/Netherlands	Test if a physical activity stimulation programme helps children with CP to improve physical activity, mobility, fitness, fatigue, and attitude towards sports more than usual paediatric physiotherapy	The six-month physical activity stimulation program, combining fitness training, counselling and home based therapy, was not effective in children with CP.
Wiart et al. (2003)	Structured phone interviews	66 families: 14 children/youth and 52 parent/caregivers (4.5–27 years). 51 had CP/Alberta, Canada	Describe and evaluate the use of powered mobility by young individuals with physical disabilities.	Younger children are now receiving powered wheelchairs. Findings suggest powered mobility is reserved for children with most severe disabilities. Physical/occupational therapists can work with more families to explore powered mobility as an option for early movement.
Ytterhus, Wendelborg, and Lundeby (2008)	In-depth interviews	37 parents of disabled children/Norway	Explore turning points and transitions emerging in the life course of children and their parents.	Change appears in disabled children's social participation/ belonging at roughly 8 years of age for children with learning difficulties and 10 years for children with mobility difficulties.
AST				
Anaby et al. (2014)	Survey; cross-sectional study; model testing	282 children/youth (5–17 years) with disabilities and 294 without; 576 parents/Canada and U.S.A.	Using three models, test the effects of personal and environmental factors (e.g. barriers and supports) on children's participation across 3 settings (home, school, and community).	Findings highlight the unique role of environment in explaining children's participation across different settings and, therefore, support development of interventions focused on modifiable environmental factors.
Einarsson et al. (2015)	Questionnaire; anthropometric measurements; ActiGraph accelerometers	91 children (6–16 years) with intellectual disability/Iceland	Investigate physical activity (PA) and patterns among Icelandic school children with mild-to-severe intellectual disability (ID), including their school travel.	PA of children with ID is considerably lower than their typically developed peers. There do not seem to be sex differences in PA and PA patterns among children with ID. No children with ID were found to meet recommended daily moderate to vigorous physical activity levels. This calls for special PA measures in this group. Only 16% of children with ID walked or biked to school, whereas this proportion is 74% for their "typically developed" peers.
Falkmer and Gregersen (2002)	Mail questionnaire	1060 families with a child born between 1983 and 1997 with CP,	Describe the perceived risk among parents concerning the travel situation for children	The use of safety belts and tie downs for technical aids on school transportation and

		spina bifida, osteogenesis imperfecta, muscular diseases, short stature, and multiple disabilities/Sweden	with disabilities, including school travel, and their self-reported knowledge of regulations and standards.	Special transport Systems is currently inadequate and not aligned with the "Vision Zero" set up by the Swedish government. Entering/exiting vehicles viewed as risky to parents due to manual assistance required. Poor postural sitting positions and professional drivers' lack of knowledge about child are key concerns. Parents lack information about regulations/standards, which causes worries. Informing parents better could reduce their worries.
Falkmer et al. (2004)	Questionnaires	1631 parents of children with autism spectrum disorders/Sweden	Investigate the transport mobility situation for children with autism spectrum disorders, including school travel.	Parents worry when their child is transported in school transport and family vehicles. Children being driven by unfamiliar drivers and alongside unknown passengers is problematic. There is need to develop well-structured approach among drivers towards children.
Falkmer et al. (2014)	Interviews using video scenarios	14 children with cognitive disabilities and a control group of 23 children/ Sweden	Assess SAFEWAY2SCHOOL programme, which is intended to enhance school transportation safety for children. Focus on whether or not children with cognitive disabilities notice, realise, understand, and accept it.	Very few differences were found in the visual scanning patterns of children with disabilities compared to those in the control group. Findings indicate that SAFEWAY2SCHOOL system is as useful for children with cognitive disabilities as it is for those in control group.
Foley and McCubbin (2009)	Demographic, BMI, and activity log data; accelerometers	9 children (7–12 years) with ID and 9 without ID/U.S.A.	Investigate if children with ID spend more time after school being sedentary by logging physical activity and screen time.	There might be different patterns of sedentary behaviours between children with/without ID; in turn, unique interventions may be needed for children with ID.

(Continued)

Table 4. Continued.

Study	Methods	Participants/location	Aim	Finding(s)
Oreskovic, Sawicki, Kinane, Winickoff, and Perrin (2009)	Questionnaire	176 families with children (5–15 years) with asthma/U.S.A.	Identify travel patterns/parental perceptions concerning school trips for children with asthma.	Few children with asthma travel to school actively. Asthma-specific concerns do not appear to guide parents' decisions about mode choice for school trips.
Pivik (2010)	Students with/ without disabilities evaluate schools	29 children/youth with physical disabilities and 22 children without disabilities/ Ontario, Canada	Conduct two studies to explore the contribution of different stakeholder groups in identifying architectural barriers in schools by having principal, special education teacher, and student independently identify barriers. For 29 schools, student evaluator had a physical disability; in 22, the student did not.	Youth with and without disabilities being involved in collaborative assessments are efficacious in terms of producing inclusive environmental assessments and identifying issues.
Pivik, McComas, and Laflamme (2002)	Focus groups	15 students (9–15 years) with mobility impairments; 12 parents/Ontario, Canada	Examine how inclusive schools are after 25 years of educational reform.	Four categories of barriers were identified: physical environment, intentional attitudinal, unintentional attitudinal, and physical limitations.
Stephens et al. (2015)	Participatory techniques, in-depth case study, cross-sectional mail survey)	Survey: 406 children (8–14 years); case study 13 children (10–14 years) with mobility impairments/Canada	Determine/question the accessibility and inclusivity of Ontario schools for children living with disability.	Disabled children face significant barriers getting to, into and around schools. Major challenges include navigating classrooms, washrooms and playgrounds.

Source: Prepared by authors.

Brogren Carlberg, & Vøllestad, 2005). However, differences in the source and type of injury/ disease and phenotype across children, even among those who share a common diagnosis, mean that researchers and practitioners can expect to discover diverse experiences that challenge normative ideas about mobility, movement, and transport.

Investigating the diverse experiences of children living with different physical impairments, and also forms of disability that are not physical in nature, could help with uncovering previously unobserved issues, policy/practice gaps, education access issues, and new solutions. Further, it could help to advance AST, CIM, and children's transportation in general in ways that connect to and are considerate of their everyday material conditions, activities, and challenges. It could also be useful to work towards recognising and better understanding how category/classification-defying comorbidities can produce a childhood inhabited by acute and/or chronic forms of medical complexity, which can be further complicated by normatively constructed social systems, institutions, and infrastructures unprepared to adequately and justly meet their needs. The experiences of children living with disability in these ways have received notably less attention than that of those with physical disability in AST and CIM research.

Children's perspective and agency

Most reviewed studies considered children's perspectives through methods that asked them to report/describe their experiences. While considering children's descriptions is surely valuable, it may prove particularly useful to design studies from a position that views children as active social agents capable of critical thought, values their input, and prioritises voicing their narratives (Fusco, Moola, Faulkner, Buliung, & Richichi, 2012).

Various studies have considered children's perspectives in order to use their input to evaluate health- and travel-related programmes/interventions (Anaby et al., 2014; Falkmer et al., 2014; Østensjø et al., 2005; see also Alriksson-Schmidt et al., 2006; Gürsel & Koruç, 2011; Van Wely et al., 2014). In other studies, children's perspectives were considered to explore and describe their experiences of mobility and transportation (see Palisano et al., 2009; Porcelli et al., 2014; Wiart et al., 2003), relationships (Skär & Tamm, 2001), and quality of life (Einarsson et al., 2015; Jemta, Dahl, Fugl-Meyer, & Stensman, 2005; Jemta, Fugl-Meyer, Oberg, & Dahl, 2009). Children's participation in these studies typically stops at describing experiences and does not involve them providing their critical input (e.g. they are not asked what they would change about their school trips and how, or what things are significant/important to them). However, a few studies (see Porcelli et al., 2014; Pivik, 2010; Pivik et al., 2002; Stephens et al., 2015) have viewed child participants as active, capable social agents and purposefully engaged their critical thinking using tailored methods. For example, in Pivik's (2010) study, children with and without disabilities were asked to evaluate schools' architectural barriers alongside school principals and special education resource teachers (SERT). Children with and without disabilities viewed the same environments differently from principals and SERTs, and found more barriers than them; and children living with disability demonstrated a clear capability for assessing their environments (Pivik, 2010, p. 515). This indicates value in introducing not only children's descriptions of experiences into studies, but also their critical thinking. In noting this, the intent is in no way to criticise research focused exclusively on children's experiences; these studies surely help with understanding their material conditions and identifying issues. Instead, the aim is to stress the value of going beyond description by seeking critical input from children living with disability, as their thoughts, needs,

desires, and ideas are just as unique as their experiences, and may provide invaluable contributions to any transportation planning study or project.

Disability perspectives

Expectedly, some reviewed studies drew upon the biomedical (Einarsson et al., 2015; Van Wely, Balemans, Becher, & Dallmeijer, 2014) and social (Soulis & Andreou, 2007) models of disability. The biomedical model locates disability within the body and treats it as an individualised issue, while the social model rejects such assumptions and instead views disability as (1) imposed by society's failure to account for disabled people, and (2) systematically felt by disabled people as a group (Oliver, 1996). Many studies, however, have moved past the dualistic thinking of these models by drawing upon numerous other approaches,[16] none more so than the World Health Organization's (WHO) International Classification of Functioning, Disability, and Health (ICF) approach (see Alriksson-Schmidt et al., 2006; Douglas et al., 2012; Østensjø et al., 2005; Wiart et al., 2003).

The ICF approach, informed by biopsychosocial (BPS) model thinking (see Engel, 1977), views disability as arising from a combination of physical, emotional, and environmental factors (WHO, 2001, p. 20). In turn, the approach is useful for overcoming any body/social world divide by questioning disability in a manner that synthesises its bodily, personal, social, and environmental dimensions. While the common use of ICF has produced valuable findings reflecting the complexity of disability experiences' bodily, emotional, and social aspects,[17] it (and other approaches) has mostly left the normalcy of disability experiences in children's transportation (i.e. the acceptance and tolerance of disabled children's exclusion, or delivery of substandard equipment/services) unquestioned. Normative conceptualisations, values, beliefs, and processes that may be ableist in nature, and in turn allow disability experiences in children's transportation to be "okayed" and persist, have gone largely unconsidered.[18]

Not questioning conceptualisations, values, beliefs, and processes that are foundational to, and which (re)produce disability experiences in children's transportation is worrying. This is because they play a role in allowing disabled children to be viewed as a "justifiably excludable-type" or, even when included, to be treated as "included as excludable" (e.g. children may be provided access to a school yard, but not its playground; or, they may be provided access to a school building or transit station, but only through one entrance; Boys, 2014, p. 176; Titchkosky, 2011, p. 78).

Ableist elements within our conceptualisations, values, beliefs, and processes might be regarded as "upstream" problems that allow for the manifestation of "downstream" problems (i.e., disabling barriers) in our material conditions (and the everyday experiences they produce). If "upstream" problems within a normative ordering go unquestioned, the reproduction of "downstream" exclusionary material conditions will continue undiminished in scope and intensity. The CAS perspective could arguably be used to think about ways to move transport scholars, practitioners, and governments beyond disablism in the study, production, and operation of transportation systems and their use.[19]

The critical ableist studies perspective

In questioning an inaccessible bus service or school entrance, CAS researchers would not only contemplate design, user experiences, and the practices that produced them. They

would also engage the system of ableism (i.e. the normative beliefs, values, and processes that prioritise an idealised type of human being and perpetuate favouritism for certain abilities) that allowed the inaccessible designs to be viewed as normal/acceptable, which in turn enabled their realisation. To question ableism, the CAS perspective employs a conception of disability that gives primacy to normalcy (Titchkosky, 2011). In other words, it does not question disability independently of (or prioritise it over) other social differences; rather, it encompasses and embraces all of them and their complex intersectionality to gain insights into how a normative order produces normalcy and, consequently, disability. Disability is thus elided into the nexus of social difference and power that produces normalcy, and its experience is viewed as an output of normalcy.

The value of the CAS perspective's intersectionality becomes apparent when one considers that when experiencing disability, a person is also experiencing other social differences and their cultural/material relations. For example, gender and age are widely known to influence how parents make decisions concerning school travel and CIM (e.g. parents thinking in relation to gendered risk narratives; making decisions to meet gendered "good parent" expectations; having fears about active travel that vary by children's age; and viewing/treating children differently on the basis of gender and age; see Barker, Kraftl, Horton, & Tucker, 2009; Buliung et al., 2014; Faulkner et al., 2010; Larsen et al., 2012; Valentine, 1996). Children's experiences of disability during school travel are not divorced from gender and age; rather, disability is experienced alongside them and affected by their associated mobility and mode choice norms. School travel patterns and CIM practices of children living with disability are not singularly shaped by disability, and should not be treated as such in research, policy, and practice.

In addition to helping to refine understandings of and criticisms towards normalcy and its ordering (e.g. the normalised exclusion of disability in school travel planning, or the singular focus on disability in accessibility planning), using a CAS perspective to consider children's everyday experiences of disability in conjunction with other social differences may help with identifying new issues and correlations within and between experiences of marginalisation associated with school travel. Its use may also help to build alliances with researchers across associated fields of study and practice. For instance, if children's transportation researchers focusing on disability were to work with others engaging gender, age, race/ethnicity, and/or class, they may find alliances through the identification of issues that they could (or should) work on together and/or policy approaches to one social difference that could be applied to another. By giving primacy to normalcy and, in doing so, simultaneously considering multiple forms of social difference, a CAS perspective could help with developing and implementing built environment, system, and service designs that account for more forms of social difference and are, in turn, more inclusive.

A nuanced, intersectional approach, such as that provided by a CAS perspective, could help with questioning and revising marginalising school travel patterns, their normalisation, and their (re)production. Since the normalcy of children's experiences of disability has gone largely unquestioned in the AST and CIM literatures, as has the relationship between disability and other social differences (e.g. race/ethnicity and class in particular), drawing on the CAS perspective in future AST and CIM research could be a helpful step towards addressing research, policy, intervention, and infrastructure gaps while disrupting the normalisation of children's experiences of disability during school travel.

Conclusion

This review has identified numerous issues concerning the (in)attention given to disability in the AST and CIM literatures. Data from search result totals indicate that disability has gone largely unconsidered, and has received notably less attention than other forms of social difference, including gender, age, race/ethnicity, and class. Further, when disability has been engaged, it has rarely been considered alongside race/ethnicity and class, which is troubling given they are jointly experienced and are known to have relationships worthy of investigation (Erevelles, 2000; Goodley, 2014).

Upon closer review of the 29 identified studies where disability was considered, issues were identified with respect to the treatment of disability in the AST/CIM literature. A significant geographic focus was found, as the majority of studies emerged from North America and the Nordic countries. This indicates a need for AST/CIM researchers to study disability elsewhere in the Global North (and beyond). Most of the research was also found to have focused on children with mobility impairments, especially those living with CP. Paying more attention to the experiences of children with different types of mobility impairments brought on by different causes and those living with other types of disability (e.g. cognitive, sensory, and intellectual), separately or in combination, should be encouraged. Doing so may help with more fully understanding the diversity of disability experiences in everyday school travel, as well as developing planning interventions that account for the varied school travel needs and desires of children living with disability.

The participation of children living with disability was found to have been mostly limited to describing experiences, leaving their critical views unconsidered. Given the unique positionality of children (living with disability), and the insightful and meaningful input they have provided in the past studies (Fusco et al., 2012; Pivik, 2010), viewing and engaging children as active social agents capable of critical thought, and designing studies to engage their critical thinking may help to ensure their needs, desires, and ideas are considered. In turn, this may help with the development and advancement of more inclusive planning policy and interventions.

Various perspectives on disability are used in the AST/CIM literature, with the ICF approach being drawn upon most often. In general, the perspectives used to consider disability have left ableist conceptualisations, beliefs, values, and practices, as well as their normative ordering of disability largely unconsidered. Since a CAS perspective supports investigations of normalcy and ableist aspects of its ordering, and does so by focusing attention on how social differences are experienced in conjunction with one another, it is suggested that a CAS viewpoint may be useful in future research. Engaging disability in conjunction with other social differences could help to fill a gap in the literature (e.g. disability's relationship with race/ethnicity and class in the fields of AST and CIM). It may also produce opportunities to identify new issues that could (or should) be considered in collaboration with researchers and practitioners across other fields, and also aid with refining understandings of normalcy and its influence on the school travel patterns and mobility practices of children living with disability. By helping researchers to engage and address ableist elements, a CAS viewpoint may very well aid with identifying and addressing any "upstream" problems in disability's normative ordering that allow for "downstream" disabling barriers to be (re)produced in the everyday material conditions of school travel experienced by children living with disability.

Notes

1. For example, school travel plans (Buliung et al., 2011); Safe Routes to School (SRTS) programmes in Europe, Australia, New Zealand, Canada, and the U.S.A. (Rothman, Buliung, Macarthur, To, & Howard, 2014); the Active and Safe Routes to School campaign in Canada (Active and Safe Routes to School, 2010); and the U.S.A.'s federal 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users in the U.S.A., which devoted $612 million to implementing SRTS programmes (Watson & Dannenberg, 2008). These policy contexts require support from school travel research that aids with the development and assessment of policy and interventions, as well as the allocation of research and intervention funding by governments.

2. The vast majority of articles emerged from the past 25 years; however, a 50-year period was applied to searches in order to create an opportunity to consider temporal trends in the literatures. At the same time, a 50-year review period was used because there has been important research on children's mobility, transportation, and experiences of cities prior to the most recent 25-year period (e.g. Colin Ward's 1978 book, *The child and the city*; Mayer Hillman's work leading up to his (and colleagues') 1990 study, *One false move … a study of children's independent mobility*).

3. For PubMed, searches were applied to "Text Word", which includes title, abstract, author supplied keywords, and Mesh headings/subheadings.

4. Proximity searches are not an option in PubMed; therefore, proximity search components of functions were not applied to searches of this database.

5. Search fields and years searched are excluded from these functions, as they were incorporated differently across databases in accordance with their specific search requirements. Proximity search operators were also adjusted in accordance to database-specific indexing language.

6. This search includes terms (i.e. "socio-economic status" and "income") that intersect with and relate to "class", but are not necessarily interchangeable with it.

7. That is, 5 secondary search functions × 5 databases × 2 sets of the literature.

8. That is, 4 tertiary search functions × 5 databases × 2 sets of the literature.

9. For this study, Global North includes Canada, the U.S.A., Europe, Australia, and New Zealand.

10. And also support assumptions about the body and "good body" ideologies (Dovey, 1999).

11. For example, in Canada, Ontario's Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing [MMAH], 2014) is used by the province to direct municipal land-use planning efforts. The PPS explicitly includes disability in its definition of "active transportation", yet disability is at times excluded from municipal plans and initiatives.

12. That is, the total AST/CIM literature concerning gender, age, race/ethnicity, and class. Disability search result totals are excluded from these search result total percentages.

13. Disability search result total percentages shown in Figure 3 are adjusted to reflect the gender, age, race/ethnicity, and class percentages.

14. Findings are not delved into in detail in this review, although they are noted in Table 4; instead, the focus is how AST/CIM researchers are engaging disability.

15. See Table 4 for numerous other studies focused on physical disability.

16. For example, phenomenology (Palisano et al., 2009), Morris' (2009) capability approach (Porcelli et al., 2014), psychological/identity studies (Gürsel & Koruç, 2011), grounded theory/interaction (Skär & Tamm, 2001), and an ecological approach (Ahl et al., 2005).

17. For example, by using the ICF perspective to study how children with CP use assistive devices and environmental modifications, Østensjø et al. (2005, p. 849) found that the "variations in use and benefits of environmental modifications indicate need of comprehensive assistive technology assessments, including child factors, family factors, technology factors and service system factors".

18. The study by Gibson et al. (2012) that questions how children with CP and their parents perceive/value walking could be described as questioning normalcy. The same might be said for McKeever et al. (2013) and their study of the symbolic value of children's upright comportment.

19. That is, "the oppressive practices of contemporary society that threaten to exclude, eradicate and neutralize those bodies, minds and community practices that fail to fit the capitalist imperative" (Goodley, 2014, p. xi).

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