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Facilitators and Barriers to Movement Integration in Elementary Classrooms: A Systematic Review

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ABSTRACT

Purpose: A systematic review was conducted to identify facilitators and barriers to movement integration (MI) in elementary school classrooms. **Method**: Online databases (Educational Resources Information Center, Google Scholar, PsycINFO, and PubMed) served as data sources for the study. Following the PRISMA guidelines, relevant published research on MI was identified and screened for inclusion in a qualitative synthesis. Content analysis of the included articles (*N* = 28) was used to identify themes of MI facilitators and barriers. Facilitators and barriers were then categorized using a social-ecological framework. **Results**: A total of 12 themes of MI facilitators and barriers were identified and categorized into two social-ecological levels: institutional factors (e.g., administrative support, resources) and intrapersonal factors (e.g., teacher confidence, ease of implementation). **Conclusion**: This review can inform research and practice aimed at supporting the implementation of MI in elementary classrooms.

Participation in regular physical activity (PA) benefits children and adolescents by reducing risk factors for diseases such as diabetes, cardiovascular disease, and obesity (Centers for Disease Control and Prevention [CDC], 2013; U.S. Department of Health and Human Services [USDHHS], 2008) and is associated with children and adolescents' improved physical, mental, and social-emotional health (Janssen, Roberts, & Thompson, 2017). International guidelines state that school-aged youth should accumulate at least 60 minutes of PA daily (World Health Organization [WHO], 2010). However, these guidelines often are not met (McMullen, Ní Chróinín, Tammelin, Pogorzelska, & van der Mars, 2015). In the United States, for instance, accelerometer data from a national sample indicated that only 42% of children and 8% of adolescents were physically active at least 60 minutes per day (Troiano et al., 2008). Furthermore, Turner, Johnson, Slater, and Chaloupka (2014) found that children spend as much as 90% of their day in sedentary time.

The Institute of Medicine (Institute of Medicine [IOM], 2013) suggests that schools offer a natural setting for increasing youth daily PA because schools provide an existing infrastructure for providing PA before, during, and after school. Additionally, schools have access to virtually all children in a centralized location and can provide multiple opportunities for all children to participate in PA each day (Pate et al., 2006). The IOM recommends that schools provide 30 minutes of PA (half of the recommended 60 minutes) during school hours, but evidence suggests that few schools are meeting this guideline. For example, only five states in the United States require the nationally recommended 150 minutes of physical education each week for elementary children and only 16.0% (eight of 50 states) require elementary schools to provide daily recess (Society of Health and Physical Educators [SHAPE] America, 2016). To increase children's daily PA, the IOM (2013) calls for a whole-of-school approach involving a coordinated effort among school professionals, families, and the surrounding community. The widely advocated model for such an approach is the comprehensive school physical activity program (CSPAP) (CDC, 2013; Hills, Dengel, & Lubans, 2015; SHAPE America, 2016). A CSPAP has been conceptualized as consisting of five components: (a) physical education, (b) PA during school (beyond physical education), (c) PA before and after school, (d) staff involvement, and (e) family and community engagement. Numerous countries support and have implemented school-based programming that aligns with the CSPAP model (McMullen et al., 2015).

Movement integration

Within a CSPAP, one strategy to help children accumulate the recommended 30 minutes of PA during school hours is to provide PA opportunities during regularly scheduled classroom time. This strategy has been referred to as movement integration (MI), which involves incorporating PA, at any level of intensity, into normal classroom time during routine transitions, as part of academic lessons, or by providing PA breaks (Parks, Solmon, & Lee, 2007; Webster, Russ, Vazou, Goh, & Erwin, 2015). Common terms include brain breaks (or bursts/boosts), activity breaks, active lessons, and movement lessons. Recent research by Russ et al. (2017) uncovered a broad and detailed range of MI approaches. Specifically, the researchers developed the System for Observing Student Movement in Academic Routines and Transitions (SOSMART) for observing and categorizing MI as it is used during parts of the school day when children are working with their "homeroom" teachers, commonly referred to as general education classroom teachers (CTs). Based on SOSMART data, a few of the most frequently occurring examples of student movement were as a result of (a) non-teacher-directed transitions (e.g., incidental movements occurred) (b) teacher-directed transitions, (c) non-academic-teacher-directed movement breaks, (d) academic-infused teacher-directed movement breaks, and (e) technology-led teacher-infused transitions or movement breaks (e.g., Go Noodle or YouTube videos) (Russ et al., 2017). While most instances of MI were observed within the general education classroom setting, teachers were sometimes observed using other spaces (e.g., outdoor play facilities) to integrate movement into regularly scheduled classroom time.

MI is widely recommended (Hills et al., 2015; IOM, 2013; Webster, Russ, et al., 2015) and has been shown to increase children's moderate-to-vigorous physical activity (MVPA) (Bartholomew & Jowers, 2011; Bartholomew et al., 2018; Beighle, Erwin, Beets, Morgan, & Le Masurier, 2010; Erwin, Beighle, Morgan, & Noland, 2011; Goh et al., 2014; Mahar et al., 2006), decrease sedentary time (Mantis, Vazou, Saint-Maurice, & Welk, 2014; Salmon et al., 2005), improve on-task behavior (Goh, Hannon, Webster, Podlog, & Newton, 2016; Mahar, 2011; Mahar et al., 2006; Riley, Lubans, Holmes, & Morgan, 2016; Riley, Morgan, & Lubans, 2015), enhance cognitive function (Donnelly & Lambourne, 2011; Howie, Newman-Norlund, & Pate, 2014), increase standardized test scores (Vazou & Smiley-Oyen, 2014), increase enjoyment (Donnelly et al., 2009; Howie et al., 2014; Vazou, Gavrilou, Mamalaki, Papanastasiou, & Sioumala, 2012), and increase perceived competence in the classroom (Vazou et al., 2012). Small bouts of MI (i.e., 10 minutes or less) in the classroom have been found to increase students' PA to moderate intensity levels (Stewart, Dennison, Kohl, & Doyle, 2004). Moreover, students' overall step counts increased during the school day as a result of teacher-incorporated MI activities (Erwin et al., 2011).

In tandem with the research demonstrating the many benefits of MI for children, studies have also identified numerous factors that may either facilitate or hinder CTs' use of MI (Webster, Russ, et al., 2015) and therefore affect the extent to which teachers integrate movement opportunities during classroom time. For instance, the type of MI and its perceived outcomes appear to be important considerations for teachers. In one study, teachers preferred activity breaks with connections to academic content (McMullen, Kulinna, & Cothran, 2014). Additionally, the teachers used movement breaks as a reward for students' good behavior to increase control in the classroom. CTs also favored activities that were easy to implement and led to student enjoyment. In another study, teachers who perceived a value in incorporating activity for the benefit of overall student wellness were more likely to implement MI (Cothran, Kulinna, & Garn, 2010). A number of studies identified barriers to teachers' use of MI (e.g., Cothran et al., 2010; Goh et al., 2014; Langille & Rodgers, 2010; Parks et al., 2007; Webster, Zarrett, Skiles-Cook, Egan, & Nesbitt, 2017). For example, teachers reported limited use of MI due to the increased demand of standardized testing and accountability in schools (Parks et al., 2007). Moreover, teachers were less likely to engage in MI when they perceived time constraints related to having too many additional responsibilities (Cothran et al., 2010). In other research, teachers expressed concerns that MI takes away from time dedicated to academic instruction (Goh et al., 2014) and can lead to difficulties maintaining classroom control (McMullen et al., 2014). In the McMullen et al. (2014) study, many teachers had not previously received professional training to incorporate MI strategies and were less likely to incorporate these strategies if they felt that it would lead to student misbehavior.

Purpose of the study

To date, no efforts have been made to systematically review the research on MI to identify and synthesize the factors associated with their use by CTs. The purpose of this study was to conduct a systematic review of facilitators and barriers to elementary CTs' use of MI. The specific research question explored was: *What factors enable or hinder elementary CTs' use of MI implementation?* This study is intended to support multiple

stakeholders (e.g., university researchers, interventionists, teacher educators, school professionals) by informing their PA promotion efforts based on the existing evidence base on MI facilitators/barriers.

Methods

Approach to systematic review

A systemic review "attempts to collate all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question" (Liberati et al., 2009, p. W-65). Systematic reviews are generally defined by four key characteristics: (a) clearly stated objectives with explicit and reproducible methodology, (b) a systematic search to identify all eligible literature for the review, (c) an assessment of the validity of research findings from individual studies, and (d) a systematic presentation and synthesis of the research findings (Liberati et al., 2009). This review adhered to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for conducting systematic reviews (Moher, Liberati, Tetzlaff, & Altman, & the PRISMA Group, 2009). These guidelines were developed to increase transparency in reporting the protocols and procedures used when conducting systematic reviews.

Search protocol and identification

A literature search was conducted to identify all published research, in English, that reported facilitators and/or barriers to using MI in elementary school settings. The search was conducted using the following four online databases: Google Scholar, PubMed, Educational Resources Information Center (ERIC), and PsycINFO. Multiple combinations of the following key words (with scaffolding) were used: "class*," "physical activity," "energizers," "exercise," "int*," "elementary" "perceptions," and "behaviors." In total, 9,042 records were identified for review. All duplicates were then removed, resulting in 5,902 records for screening.

Eligibility and screening

The identified records were included in the review if they (a) were a peer-reviewed research article, (b) included a focus on the primary/elementary school setting (i.e., ages 5–11), (c) included a focus on PA provided to children during scheduled classroom time, and (d) contained facilitators and/or barriers to using MI. Screening (Figure 1) consisted of first reading the titles and/or abstracts of all records to determine if the records met all inclusion criteria. During this stage, an additional 71 records were identified from the reference lists of review articles yielded from the search. In total, 5,851 records were excluded from further review. Abstracts of the remaining 51 records did not contain enough information to determine whether all inclusion criteria were met. Therefore, full-text articles for these records were obtained and screened, resulting in 28 articles that were retained for analysis (Table 1). For clarification, full-text records listed in the table as excluded because of "anecdotal evidence" were articles that reported original research but included only anecdotal evidence in relation to MI (e.g., as part of a larger study of school PA promotion).

Data analysis

A content analysis was used to qualitatively synthesize the factors identified in the included articles. The first and third author independently searched for, distilled, and listed (by article) reported facilitators and barriers for MI and then cross-checked samples (50%) of each other's work, discussed and resolved discrepancies, and together finalized the list. Next, the lists across articles were combined to create a comprehensive list of facilitators and barriers. The first and third authors examined the list for redundancies and similarities and grouped all facilitators and barriers thematically.

Social ecological framework

A social-ecological perspective was used to categorize themes of facilitators and barriers to MI in this review. Social ecological models (SEM) provide a meaningful framework to conceptualize the different levels of factors (i.e., facilitators and barriers) that can directly or indirectly influence behavior (Berkman & Glass, 2000; Bronfenbrenner, 1977, 1979; Emmons, 2000; Langille & Rodgers, 2010; McLeroy, Bibeau, Steckler, & Glanz, 1988; Webster & Suzuki, 2014). McLeroy et al. (1988) suggested five levels of factors that relate to health promotion interventions: (a) intrapersonal, (b) interpersonal, (c) institutional, (d) community, and (e) public policy. *Intrapersonal* factors are defined as personal characteristics, such as knowledge and beliefs. For example, teachers with more favorable attitudes toward MI may be more likely to use it. At the *interpersonal* level, factors include social networks and relationships with others (e.g., colleagues, family). Thus, a teacher may have a positive attitude toward using MI but feel conflicted about using it because other teachers express concerns about its impact on student conduct and academic performance. The *institutional* level is defined
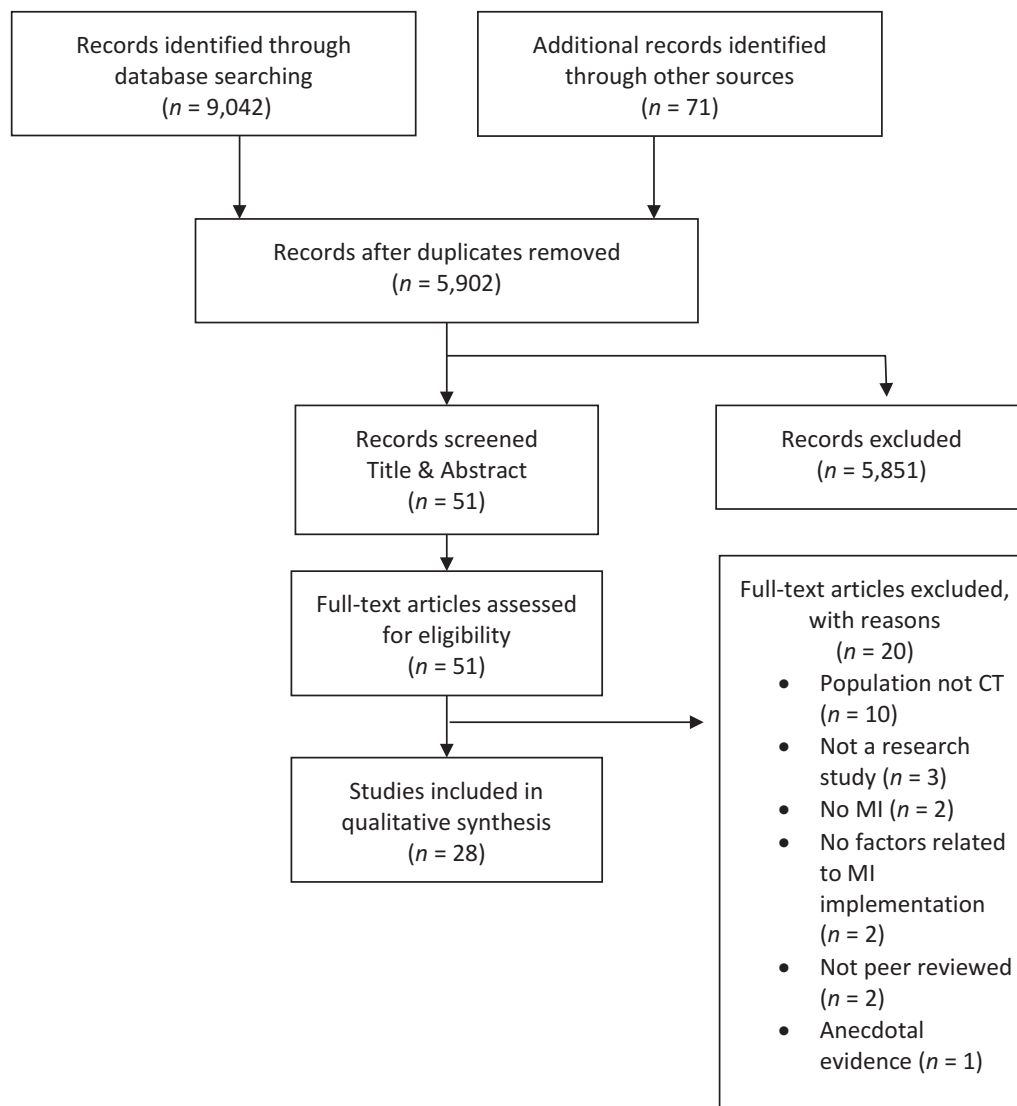
Figure 1. Flowchart of selection process for the MI review resulting in inclusion of 28 unique records.

by factors that characterize the organization in which the individual's health promotion behavior is being examined (e.g., school). Teachers who work in schools with more classroom space for movement and a supportive administrative team may feel more inclined to use MI. *Community* factors encompasses the broader arena of organizational networks surrounding and involving the institution in question. A school with close ties to other organizations that support children's PA could enhance the school's orientation toward PA promotion and capacity for supporting MI, which could in turn cultivate teachers' use of MI. Finally, factors at the *public policy* level include local, state, and national laws/policies (e.g., a school district policy requiring schools to schedule a certain number of minutes of PA each week) (McLeroy et al., 1988).

Ecological perspectives highlight the multiple levels of influence that need to be considered when designing interventions that target behavior change. The uptake of MI in schools can be shaped by factors at one or more levels of a SEM, and these factors may interact in various ways to influence individuals' behavior. For instance, Webster et al. (2013) found that South Carolina CTs' awareness of a state policy requiring schools to provide 90 minutes of PA each week beyond physical education (public policy level factor) directly predicted the teachers' perceived school support for MI (institutional level factor). In turn, perceived school support directly predicted the teachers' perceived attributes of MI (intrapersonal factor), which directly predicted the teachers' self-reported use of MI (target behavior). For the purposes of the present study,

Table 1. Articles included for qualitative synthesis.

1.	Allison et al. (2016)
2.	Aminian et al. (2015)
3.	Brown and Elliott (2015)
4.	Cothran et al. (2010)
5.	Dinkel et al. (2016)
6.	Dinkel et al. (2017)
7.	Dunn et al. (2012)
8.	Evenson et al. (2009)
9.	Gately, Curtis, & Hardaker (2013)
10.	Gibson et al. (2008)
11.	Graham et al. (2014)
12.	Howie et al. (2014)
13.	Langille and Rodgers (2010)
14.	Martin et al. (2010)
15.	Martin and Murtagh (2015)
16.	Masse, McKay, Valente, Brant, and Naylor (2012)
17.	Masse et al. (2013)
18.	McMullen et al. (2014)
19.	McMullen et al. (2016)
20.	Naylor et al. (2006)
21.	Parks et al. (2007)
22.	Perera et al. (2015)
23.	Stylianou et al. (2016)
24.	Usher and Anderton (2014)
25.	Vazou and Vlachopoulos (2014)
26.	Webster et al. (2015)
27.	Webster et al. (2013)
28.	Webster et al. (2017)

Note. Articles listed alphabetically.

McLeroy et al.'s (1988) model provided a way to align the study's findings (i.e., themes) with an ecological perspective, which may more readily inform intervention design and professional trainings for teachers.

Findings

A total of 12 themes across MI facilitators and barriers were identified, and the themes were categorized within two levels of McLeroy et al.'s (1988) SEM: (a) institutional and (b) intrapersonal (Table 2). Institutional factors included MI facilitators/barriers that occur at the school/district level, while intrapersonal factors included facilitators/barriers that exist within the teacher.

Institutional factors

MI facilitators

Two themes of MI facilitators were categorized as institutional factors: (a) administrative support and (b) availability of resources.

Descriptions of administrative support included having school board support (Brown & Elliott, 2015); receiving playground equipment and other resources from the school and/or school district (Graham, Lucas-Thompson, & O'Donnell, 2014; Webster et al., 2017); getting permission from the principal to devote time to PA (Naylor, Macdonald, Zebedee, Reed, & McKay, 2006); the principal offering MI trainings during staff meetings, sharing MI ideas, and providing supportive feedback (Stylianou, Kulinna, & Naiman, 2016); the

school administration offering schoolwide PA programs (Webster et al., 2017); and the principal providing time for teacher collaboration about MI (Webster et al., 2017).

Specific resource facilitators described were having a variety of equipment/furniture alternatives in the classroom (e.g., standing desks, plyo balls) (Aminian, Hinckson, & Stewart, 2015), resources being provided by/available through the school board (Brown & Elliott, 2015), easy access to activity ideas and equipment (Brown & Elliott, 2015), the availability of facilities and outdoor space (Brown & Elliott, 2015; Usher & Anderton, 2014), having a designated area for MI implementation (Webster et al., 2017), and having a physical education teacher who can serve as a resource (Masse, Naiman, & Naylor, 2013).

MI barriers

Four themes of MI barriers were categorized as institutional factors: (a) lack of time, (b) lack of resources, (c) lack of space, and (d) lack of administrative support. Competing curricular demands and lack of time often overlapped with pressures related to standardized testing, and teachers frequently reported having an overcrowded curriculum. Evenson, Ballard, Lee, and Ammerman (2009) pointed out the academic concerns related to time: "… with increased emphasis on testing, schools are challenged to set aside time for physical activity" (p. 235). Similarly, Cothran et al. (2010) asserted, "The pressures of testing are very real and simply asking teachers to add physical activity to their day is not fair or realistic" (p. 1387). Additionally, time for MI was a challenge for teachers due to a wide range of other duties (e.g., making report cards) and frequent school disruptions (e.g., field trips, school assemblies, announcements) (Brown & Elliott, 2015; Gately, Curtis, & Hardaker, 2013; Gibson et al., 2008; Naylor et al., 2006). One of the teachers in the Brown and Elliott (2015) study said, "I just pray for one regular day" (p. 77).

Lack of resources were barriers that included lack of facilities (Brown & Elliott, 2015; Gately et al., 2013), lack of equipment/materials (Brown & Elliott, 2015), problems with technology (Dinkel, Schaffer, Snyder, & Lee, 2017; Naylor et al., 2006), lack of funding (Brown & Elliott, 2015; Evenson et al., 2009), lack of activity/content ideas (Brown & Elliott, 2015; Dinkel et al., 2017), and lack of training opportunities (Brown & Elliott, 2015). For example, one of the teachers in the Brown and Elliott (2015) study stated that the biggest challenge for teachers trying to implement a daily PA policy was that they were out of ideas for MI and needed premade

Table 2. Final themes of MI factors and their SEM levels.

Theme	Source(s)	SEM Level
Facilitators		
1. Administrative support	Allison et al. (2016); Brown and Elliott (2015); Dinkel et al. (2017); Graham et al. (2014); Naylor et al. (2006); Stylianou et al. (2016); Webster et al. (2013);	Institutional
2. Availability of resources	Allison et al. (2016); Aminian et al. (2015); Brown and Elliott (2015); Masse et al. (2012); Masse et al. (2013); Naylor et al. (2006); Usher and Anderton (2014); Webster et al. (2017)	Institutional
3. Perception that PA is valuable	Allison et al. (2016); Aminian et al. (2015); Brown and Elliott (2015); Cothran et al. (2010); Dinkel et al. (2017); Evenson et al. (2009); Gately et al. (2013); Gibson et al. (2008); Graham et al. (2014); Howie et al. (2014); Martin and Murtagh (2015); Masse et al. (2012); Masse et al. (2013); McMullen et al. (2014); McMullen et al. (2016); Naylor et al. (2006); Parks et al. (2007); Perera et al. (2015); Stylianou et al. (2016); Webster et al. (2015); Webster et al. (2017)	Intrapersonal
4. Perceived ease of implementation	Dinkel et al. (2017); Gibson et al. (2008); Langille & Rodgers, 2010; Martin and Murtagh (2015); Masse et al. (2012); McMullen et al. (2014); McMullen et al. (2014); McMullen et al. (2016); Webster et al. (2013)	Intrapersonal
5. Teacher confidence	Allison et al. (2016); Dinkel et al. (2017); Masse et al. (2012); Naylor et al. (2006); Parks et al. (2007); Perera et al. (2015); Usher and Anderton (2014); Webster et al. (2015)	Intrapersonal
Barriers		
6. Lack of time	Allison et al. (2016); Brown and Elliott (2015); Cothran et al. (2010); Dinkel et al. (2016); Dinkel et al. (2017); Evenson et al. (2009); Gately et al. (2013); Gibson et al. (2008); Graham et al. (2014); Langille and Rodgers (2010); Martin et al. (2010); Masse et al. (2013); Naylor et al. (2006); Parks et al. (2007); Perera et al. (2015); Stylianou et al. (2016); Usher and Anderton (2014); Webster et al. (2017)	Institutional
7. Lack of resources	Allison et al. (2016); Brown and Elliott (2015); Dinkel et al. (2016); Dinkel et al. (2017); Evenson et al. (2009); Gately et al. (2013); Gibson et al. (2008); Masse et al. (2013); McMullen et al. (2014); McMullen et al. (2016); Naylor et al. (2006); Perera et al. (2015); Usher and Anderton (2014); Webster et al. (2017)	Institutional
8. Lack of space	Allison et al. (2016); Brown and Elliott (2015); Dinkel et al. (2016); Dinkel et al. (2017); Dunn et al. (2012); Evenson et al. (2009); Masse et al. (2012); Masse et al. (2013); McMullen et al. (2016); Naylor et al. (2006); Perera et al. (2015); Webster et al. (2017)	Institutional
9. Lack of administrative support	Allison et al. (2016); Brown and Elliott (2015); Dinkel et al. (2016); Graham et al. (2014); Masse et al. (2013); Naylor et al. (2006); Perera et al. (2015); Webster et al. (2013); Webster et al. (2017)	Institutional
10. Implementation challenges	Brown and Elliott (2015); Cothran et al. (2010); Dinkel et al. (2016); Dinkel et al. (2017); Evenson et al. (2009); Gately et al. (2013); Gibson et al. (2008); Martin and Murtagh (2015); Masse et al. (2013); McMullen et al. (2014); McMullen et al. (2016); Naylor et al. (2006); Stylianou et al. (2016); Webster et al. (2017)	Intrapersonal
11. Lack of teacher motivation	Brown and Elliott (2015); Evenson et al. (2009); Perera et al. (2015); Vazou and Vlachopoulos (2014); Webster et al. (2013); Webster et al. (2017)	Intrapersonal
12. Lack of training	Brown and Elliott (2015); Dinkel et al. (2017); Masse et al. (2013); McMullen et al. (2016); Perera et al. (2015)	Intrapersonal

Note. MI = movement integration; SEM = social ecological model; PA = physical activity.

activities. With respect to technology challenges, Dinkel et al. (2017) quoted a kindergarten teacher who said, "I think there were a handful of times where I tried to log on [to access online resource] and it was either too slow, or wouldn't load at all" (p. 191).

Space limitations were focused on not having adequate space in the classroom environment to integrate movement. For example, Dunn, Venturanza, Walsh, and Nonas (2012) reported that PA was significantly lower in classrooms with 26–30 students than in classrooms with 20–25 students, while a teacher in the Webster et al. (2017) study stated, "I can't imagine having 25 kids that'd be running into each other everywhere. Just walking across the room would be a chore" (p. 138). McMullen, Martin, Jones, and Murtagh (2016) found evidence from interviews with teachers in Ireland that space concerns were "related to meeting curricular goals, classroom set-up, class size (i.e., number of pupils), and the nature of the physical

activity in the classroom" (p. 325). Some of the teachers felt that certain activities they were trained to use (from the Moving to Learn Ireland program) would have been more appropriately implemented in the sports hall (gymnasium) than in the elementary classroom setting.

Lack of administrative support was a barrier that included lack of school board support (Allison et al., 2016), lack of administrative buy-in (Graham et al., 2014), lack of PA programming (Graham et al., 2014), lack of guidance from the district (Masse et al., 2013), and lack of principal support (Perera, Frei, Frei, & Bobe, 2015). For example, Masse et al. (2013) found that following the implementation of daily PA and food and beverage sales guidelines in Canada, teachers felt the school districts "dumped" (p. 6) the guidelines onto the schools without explaining what the guidelines mean or how to achieve them. In the Graham et al. (2014) study, teachers made comments such as "A lot of what we do is based on the administration… . A big initiative across the board won't happen from teachers—they have so much on their

plate" and "it's proven over and over again that more active kids perform better, but there are blinders put on at the administrative level" (p. 5).

Intrapersonal factors

MI facilitators

Four themes of MI facilitators were categorized as intrapersonal factors: (a) perception that PA is valuable, (b) perceived ease of implementation, and (c) teacher confidence. Teachers' perceptions that PA is valuable encompassed feelings that MI is as important as other teacher functions (e.g., academic instruction) and will lead to student benefits (e.g., improved academic achievement and on-task behavior). For instance, focus group participants in the Graham et al. (2014) study discussed numerous benefits of PA for students, including increased student focus, improved mental health, and positive mood changes. In the Perera et al. (2015) study, 90% of the teachers who were surveyed identified improved concentration as a benefit of classroom PA breaks, while 58% of the teachers identified energy level as a benefit, and 47% of the teachers identified peer interaction as a benefit. Teachers also valued MI because of its contribution to the whole child, particularly in terms of student wellness and enjoyment. For example, Cothran et al. (2010) found that teachers in their study used MI more when they felt it benefited student wellness. In the Aminian et al. (2015) study, teachers who worked in classrooms that received the intervention (standing desks were used in place of traditional sit-down desks), mentioned that children's behavior improved because they were happier. One of the teachers said, "When children are happier, they behave better, do better, then the teacher is happier as well" (p. 641).

Ease of implementation was also a key factor in teachers deciding to implement MI into the classroom (Dinkel et al., 2017; Martin, Martin, & Rosengard, 2010; Martin & Murtagh, 2015; McMullen et al., 2014, 2016; Webster et al., 2013). Teachers liked lessons that were quick, simple, and required minimal equipment. For instance, teachers in the Martin et al. (2010) study "lauded the program's [PE2GO] ease of implementation" (p. 680). McMullen et al. (2016) reported that "teachers seemed to appreciate that the lessons could be done in a short period of time" and that "simple lessons that were easy to implement in a short time period appear to be important to this group of teachers when considering their existing time constraints" (p. 326). In the Webster et al. (2013) study, perceived simplicity of MI was found to be a significant predictor of teachers' self-reported

use of MI. Ease of implementation meant different things to different teachers. For example, some teachers preferred MI to be connected to academics (Martin & Murtagh, 2015; McMullen et al., 2014), while other teachers liked the autonomy to make their own MI choices (Langille & Rodgers, 2010).

With respect to teacher confidence, teachers in the Parks et al. (2007) and Webster, Buchan, et al. (2015) studies who felt more efficacious or perceived themselves to have higher competence for MI were more likely to be willing to integrate movement and report higher frequency of using MI respectively. Additionally, Allison et al. (2016) found that teachers expressing high confidence in successfully planning and implementing MI were more likely to report implementation fidelity in their classroom than teachers expressing low or moderate confidence. Usher and Anderton (2014) reported that teacher confidence was one of the most significant facilitators to teachers' MI and that teachers' playing and coaching experiences in PA (e.g., playing sports, earning coaching credentials) were important factors underpinning their confidence in using MI.

MI barriers

Three themes of MI barriers were categorized as intrapersonal factors: (a) implementation challenges, (b) lack of teacher motivation, and (c) lack of training. Implementation challenges included classroom management (Evenson et al., 2009; McMullen et al., 2014; Naylor et al., 2006; Stylianou et al., 2016; Webster et al., 2017), implementing PA in older grades (due to greater curriclar demands) (Brown & Elliott, 2015), incorporating PA with academic subjects (Dinkel, Lee, & Schaffer, 2016), differentiating PA opportunities for students with disabilities and different developmental levels (Evenson et al., 2009), and planning MI activities for substitute teachers (Gibson et al., 2008). Classroom management barriers surfaced as a dominant theme related to implementation challenges. Specific issues included off-task student behavior (Evenson et al., 2009), chaos (e.g., students being rowdy during MI) (McMullen et al., 2014), safety concerns (McMullen et al., 2014; Webster et al., 2017), transition challenges including moving from classroom to classroom (Naylor et al., 2006) and transitioning from a movement opportunity back to seatwork (Stylianou et al., 2016), management inconsistencies (e.g., practicing and reinforcing routines, clarity of instructions) (Stylianou et al., 2016), and disruptions to teachers' schedules (Webster et al., 2017). McMullen et al. (2014) reported that getting back on task following activity breaks was an issue, particularly when during the activities, children were "rowdy," "squirrely," or "rough" (p. 516).

Teachers' own lack of motivation to use MI was an additional barrier to MI. In Perera et al.'s (2015) study, a small portion (5%) of 116 elementary teachers indicated "it's [PA] not my responsibility." Teachers often did not feel comfortable or motivated promoting PA. Brown and Elliott (2015) reported that participants "discussed teacher-specific characteristics, including that some teachers are not comfortable teaching PA and others are unmotivated to implement [Daily Physical Activity]." Evenson et al. (2009) offered that "some teachers do not have the desire or physical ability to lead in these types of activities." McMullen et al. (2016) stated that a teacher had "not tried to incorporate movement into [her] academic lessons due to a lack of knowledge as to how to implement it effectively" (p. 326). In the study by Vazou and Vlachopoulos (2014), external regulation (generally viewed as a maladaptive form of motivation) and amotivation (a total lack of motivation) were significantly and negatively correlated with participants' (including teachers) intentions to continue to use Just-a-Minute (JAM) routines in the future (JAM is a program that provides simple one-minute classroom activity breaks).

Lack of training was identified as a barrier in terms of having limited training opportunities (Brown & Elliott, 2015), trainings being optional (Brown & Elliott, 2015), ineffective/inadequate training (e.g., teachers feeling unprepared or unable to implement MI) (Martin et al., 2010; Perera et al., 2015), lack of curricular guidelines and resources (e.g., teachers wanted new content ideas and suggestions), and lack of continuing professional development (e.g., ongoing support and resources) (McMullen et al., 2016). Some teachers had trouble conceptualizing what was supposed to count as PA or what MI looked like or complained that there was insufficient curriculum or materials related to MI (Brown & Elliott, 2015; Dinkel et al., 2017; Masse et al., 2013; McMullen et al., 2016; Perera et al., 2015). Masse et al. (2013) highlighted some of the issues related to conceptualizing PA:

> Many of the complexity issues revolved around understanding of the guidelines … many [teachers] struggled with the lack of direction provided in the [Daily Physical Activity] guidelines; what counted toward [Daily Physical Activity] and how activities should be structured to count toward [Daily Physical Activity]. (p. 7)

Discussion

This study systematically reviewed the facilitators and barriers to implementation of elementary classroom MI. The CSPAP model provides a framework to harness the school environment for children's PA promotion (CDC,

2013; Hills et al., 2015; SHAPE America, 2016). Due to reduced physical education opportunities (e.g., SHAPE America, 2016), the use of MI in the academic classroom has been targeted to help children accumulate the recommended 30 minutes of PA during school hours (IOM, 2013). It is important to examine factors related to MI in the elementary school setting to develop an understanding of how to successfully promote PA during school (Webster, Russ, et al., 2015). Our findings show that facilitators and barriers to MI exist at two levels of influence: institutional and intrapersonal.

At the institutional level, administrative support and resources for MI emerged as key factors associated with CTs' use of MI. These factors were identified either as facilitators or barriers in previous research. That is, the presence of these factors was important to MI implementation, whereas their absence clearly limited teachers' engagement with MI initiatives. Resources may be intertwined with administrative support. For example, Masse et al. (2013) found that an important MI resource for CTs is the physical education teacher. Thus, administrators may consider allocating some of the physical education teachers' workload to supporting classroom teachers (e.g., conducting classroom observations and providing MI suggestions, planning with grade-level teams to incorporate MI into academic lessons) and hiring a qualified part-time or substitute teacher to cover physical education lessons during these times. Additionally, administrative support could involve increasing teachers' awareness of policies related to MI, as a few studies found policy awareness to be an important factor in teachers' use of MI (Allison et al., 2016; Graham et al., 2014; Webster et al., 2013). By communicating such policies to teachers, administrators can demonstrate their belief that PA promotion is an important school function.

Little research has focused on the roles and perspectives of school administrators with respect to MI or, more broadly, CSPAPs. However, helping principals understand the benefits of MI and its potentially unique contribution to ensuring children receive frequent daily opportunities to move and be active may be one effective strategy to increase administrative support and secure appropriate resources. It may also be useful to present MI to administrators as an innovative educational practice. In the study by Webster et al. (2017), some CTs discussed already having some support for MI from their principal, who was always looking for cutting-edge ideas.

Beyond increasing administrative support, other suggestions to overcome a lack of MI resources are to share resources within or between schools (e.g., develop a resource-sharing system with the physical education

teacher or with a neighboring school), use MI activities that require no additional equipment, and seek funding opportunities (e.g., grants). Teachers may also find that MI often can be promoted through naturally occurring classroom routines. When developing the SOSMART instrument, Russ et al. (2017) found that the majority of children's movement opportunities observed were a result of non-teacher-directed transitions (e.g., children independently walking around the classroom to get materials they needed) and teacher-led transitions (e.g., the teacher directing students to move from their desks to the front of the room to listen to a story). Establishing a classroom management system that permits children to move independently while staying on task, placing learning materials in different locations around the classroom, and capitalizing on frequent transitions between lessons are MI facilitative strategies that do not require any new resources.

CTs' biggest institutional barrier to MI was not having enough time. Efforts to increase teachers' use of MI should therefore focus on helping teachers learn to view MI as a noncompetitor to other school priorities and even take advantage of MI as a time-saving strategy. Sharing research on the academic benefits of MI (e.g., improved on-task behavior, increased standardized test scores) (Goh et al., 2016; Mahar, 2011; Mahar et al., 2006; Riley et al., 2016, 2015) may be an important step in convincing teachers that MI will reduce the time needed to gain students' attention and establish/reinforce a classroom management system, which may accelerate student learning.

Addressing the institutional-level barriers to MI (lack of time, lack of resources, lack of space, and lack of administrator support) may be directly related to the intrapersonal barriers (implementation challenges, lack of teacher motivation, lack of training) identified in this study. Teachers would likely face fewer MI implementation challenges and feel more motivated to use MI if their administrators provided increased access to MI trainings that focused on using a wide range of MI strategies and the conditions needed for successful MI implementation. SOSMART (Russ et al., 2017) identifies several different MI strategies, which can be viewed as a progression from relatively easy to implement (e.g., capitalizing on non-teacher-directed transitions) to more complex (e.g., teaching/reviewing academic content via movement experiences). Teachers may face fewer implementation challenges if they are introduced to various MI strategies and are able to choose options that fit their preferences, comfort zone, and classroom context (Webster, Russ, et al., 2015). Conditions for success could include enacting appropriate classroom management protocols (e.g., establishing ground rules

for each activity, using a start/stop signal, using a calming activity to transition back to seatwork), planning to overcome barriers (e.g., securing MI into classroom routines and/or lesson plans, organizing classroom space to accommodate more movement, developing strategies to effectively include children with special needs), and applying the LET US Play principles (Weaver, Webster, & Beets, 2013)—avoid *l*ines; avoid *e*limination; make small *t*eams/groups; avoid being an *u*ninvolved teacher; and maximizing *s*pace, equipment, and rules—to optimize the value of each PA opportunity. In turn, teachers with more training, fewer implementation challenges, and higher motivation to use MI may develop perceptions that were found in this study to facilitate MI (i.e., PA is valuable, MI is easy to implement, and confidence in using MI).

The lack of factors identified in this study at other levels of McLeroy et al.'s (1988) SEM (i.e., interpersonal, community, public policy) may be an indication of limited investigation into variables at these levels, which could be facilitators or barriers to elementary teachers' use of MI. For example, recent research (Weaver et al., 2017) suggests that the community level may merit further attention from interventionists, as well as from teacher educators, aiming to increase MI in schools as external (i.e., beyond school) support structures could be used to buttress and strengthen MI initiatives. Weaver et al. (2017) found that school-university collaborations that drew on Webster, Beets, Weaver, Vazou, and Russ's (2015) partnership model (community-based participatory research, communities of practice, and university service learning) were effective in increasing children's school-based PA during physical education and regular classroom time. Though not without challenges, this school-university partnership approach appears to hold promise for future MI interventions and teacher professional development trainings (Egan et al., 2017; Michael et al., 2018; Webster, Weaver, Egan, Brian, & Vazou, 2018).

In conclusion, this research synthesis identifies key factors that warrant careful consideration in program planning for interventions and teacher education related to MI. Based on the findings, institutional (e.g., administrator support) and intrapersonal (e.g., implementation challenges) variables should be targeted when attempting to increase teachers' use of MI. Additional studies are needed to better understand the potential influences of interpersonal, community, and public policy variables in MI implementation. Investigations that encompass all SEM levels to identify influential factors and how they relate are needed to optimize the value of efforts aimed

at more fully and routinely integrating movement opportunities for elementary children during regularly scheduled classroom time.

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