



STUDY PROTOCOL

# Communicating Physical Activity with Adolescents: What works? A scoping review protocol [version 1; peer review: 2 approved]

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## Abstract

**Background:** Worldwide, adolescents are not meeting the minimum recommended physical activity (PA) guidelines to achieve health benefits. Awareness of the guidelines among adolescents is low, only 3.6% can report them correctly. The school is an ideal PA promotion setting, no other institute has the same reach or influence on the adolescent population. There is a need for an effective communication strategy for PA messages for adolescents. The purpose of this review is to explore how, when, who, where and what i.e. the content, context and mode of delivery of PA messages to communicate with adolescents to improve their awareness and understanding of PA that will potentially lead to an increase in PA levels. **Methods:** A scoping review was selected as the most appropriate methodology due to the broad nature of the research question. The PCC mnemonic (Population, concept, context), recommended by the Joanna Briggs Institute, was used to develop the search strategy and research question. This review will follow the scoping review framework developed by Arksey and O'Malley (2005) which was later updated by Levac *et al* (2010) to ensure the methods are systematic. It will also follow the PRISMA extension for scoping reviews checklist. Sources include databases (CINAHL, Education Source, Scopus, PubMed), grey literature from the World Health Organisation, Global Index Medicus and the reference lists of extracted articles will be checked from the year 1995 onwards. **Results:** A PRISMA flow diagram will demonstrate the final articles included and results will be presented and summarised as recurring themes. The results will be discussed in relation to existing literature and future implications for research, policy and practice. **Conclusion:** This will be the first review to explore the PA messaging context among adolescents and the findings will help inform a strategy for communicating PA to adolescents.

## Open Peer Review

Approval Status  

	1	2
<b>version 1</b> 25 Aug 2022	 <a href="#">view</a>	 <a href="#">view</a>

1. **Matthew Mclaughlin** , The University of Western Australia, Callaghan, Australia
2. **Leanne C. Doherty** , Ulster University, Coleraine, UK

Any reports and responses or comments on the article can be found at the end of the article.

## Keywords

Effective communication, Physical Activity Messaging, youth, post-primary

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## Introduction

The health benefits of engaging in regular physical activity (PA) are widely documented<sup>1</sup>. However, over 80% of adolescents (11–17yrs) worldwide do not meet the PA guidelines to achieve these health benefits<sup>2</sup>. The complex physical inactivity challenge has no single solution. The Global Action Plan for Physical Activity recommends a systems approach and multi-level stakeholder support through community wide interventions and national strategies to tackle the problem (low levels of PA) which involves creating connections, interactions and feedback between system architects<sup>3,4</sup>. Adolescence is an important life stage where PA patterns track into adulthood, researchers have called for an effective communication strategy for disseminating the message to ensure that young people are aware of and understand the PA recommendations<sup>5–7</sup>. A research study conducted in Portugal during the 2011–2012 academic year showed that less than 4% of adolescents were able to correctly identify the PA guidelines for children and adolescents with no statistically significant differences between gender or socio-economic status<sup>6</sup>.

The school is an ideal setting for PA promotion albeit a unique, complex and adaptive sub-system thus, a systems approach is essential to increase population levels of PA among children and adolescents<sup>8,9</sup>. There are a wide range of professionals outside of the health sector with a potential role in promoting PA to adolescents, such as teachers within the school setting<sup>10</sup>. A large proportion of children and adolescents' waking day revolves around school; no other institution has the same reach or influence over this population<sup>5</sup>. The International Society for Physical Activity and Health recommends whole-of-school programmes as one of the eight best investments for PA promotion among children and adolescents, this is a multi-component approach that aims to promote PA to all members of the school community<sup>11</sup>. This can include physical education programs, active classrooms, after school PA opportunities, activities during break times and promoting active travel<sup>11</sup>. Some examples of whole-of-school programmes include the Active School Flag (Ireland), Finnish Schools on the Move (Finland), Sigue la Huella (Spain) and the Comprehensive Schools Physical Activity Promotion (USA) working towards this approach<sup>12–15</sup>. Finally, curriculum subjects such as physical education and wellbeing are important opportunities for the promotion of PA to adolescents within the school setting. In order to support the promotion of PA in schools the needs within the school setting must be understood. One such solution is to identify acceptable and effective communication methods and tools that align with the strategic priorities and routine work within the school<sup>10</sup>.

PA messaging has been described as 'the overall process of creating and delivering PA messages' and has potential to improve population PA levels<sup>16</sup>. Previous reviews have provided recommendations for improving the communication of PA messages to the general public, underserved communities, parents and children with disabilities<sup>10,16–21</sup>. Some approaches used when communicating messages in the aforementioned studies

include formative research, social marketing principals, message tailoring and message framing.

- i. *Formative research* is the act of gathering data that can be used for the development and implementation of programmes<sup>22</sup>. It can help determine the appropriate message content, context and delivery methods suitable for the target population<sup>16</sup>.
- ii. *Social marketing* uses commercial marketing ideas and strategies to promote voluntary behavioural change; it involves the exchange of a product (i.e. PA) for a cost (i.e. time or energy) in a manner that is attractive to an individual<sup>23,24</sup>. It uses affective and emotional responses to make a product more appealing<sup>16</sup>. The VERB campaign is an example where this approach was successful in promoting PA as enjoyable and fun to adolescents<sup>25</sup>. After four years of the campaign 75% or more tweens (9–13yrs) were aware of and understood the VERB messages and in the final year, 28% had unprompted recall of VERB<sup>26</sup>.
- iii. *Message tailoring* or targeting presents information that is suitable to the individual characteristics of the message recipient<sup>18</sup>. Tailoring messages has been proven to increase message salience and the impact of the message on the behaviour change<sup>27,28</sup>. Although message tailoring should be considered a promising practice with potential to enhance the effectiveness of messages accompanying the PA guidelines, it is not essential<sup>18</sup>.
- iv. *PA message framing*, originating from Prospect Theory, suggests that individuals will respond differently to factually equivalent messages depending on whether they are worded to highlight benefits or consequences<sup>16,18,29</sup>. Gain framing is generally preferred over loss-framing messages when promoting PA potentially due to its inclusion of information targeting the psychological determinants of PA<sup>18</sup>.

Each of these approaches contribute to understanding the needs within the target group, the development and delivery of acceptable and effective communication methods and tools to support PA promotion. There is a need to explore the literature to determine which methods are suitable to ensure effective communication with adolescents in order to increase PA knowledge, awareness, attitudes and levels.

## Rationale for this scoping review

A scoping review addresses broader topics where many different study designs might be applicable and is unlikely to address specific research questions nor assess the quality of included studies<sup>30</sup>. In contrast, a systematic review would typically focus on a well-defined question, can identify study designs, with the aim to provide answers to the questions from a narrow range of quality assessed studies. Due to the broad nature of the research topic, a scoping review was identified as the most appropriate methodological approach. It will

allow us to explore the breadth or depth of the literature, map and summarise the evidence, inform future research and identify and address knowledge gaps<sup>31</sup>.

Preliminary searches were conducted by the primary author, on communicating PA messages to adolescents across various databases like CINAHL, Scopus, PubMed. The searches revealed no reviews conducted that focused solely on PA messages for the adolescent population in general. Reviews that targeted PA messaging with other population groups meeting our eligibility criteria e.g. children with physical disabilities, were identified and will be included in the review<sup>16,21</sup>. Little evidence identifying the most effective methods of communicating PA messages to adolescents i.e. content, context and mode of delivery was found. Thus, this review will help determine the extent of the literature among adolescents and clarify the key concepts of communicating messages to adolescents.

### Scoping review aims

This research aims to explore existing messaging techniques or strategies in PA promotion interventions for adolescents, their implementation and effectiveness in leading to a positive PA behaviour change.

### Objectives

The specific objectives are to:

1. Identify and map the literature on how messages have previously been communicated to adolescents in relation to PA
2. Clarify the methods and approaches used in previous studies that involved communicating messages to adolescents.
3. Discuss the evaluation of the outcomes measured in the articles identified within the scoping review.

### Methods

#### Protocol

This scoping review will follow the guidelines and stages set out by Levac, Colquhoun<sup>32</sup> who built upon the methodological framework set out by Arksey and O'Malley<sup>30</sup>. This updated framework has six essential stages: i) identifying the research question, ii) identifying relevant studies, iii) study selection, iv) charting the data, v) collating, summarising and reporting results and vi) consultation with knowledge users. The preferred reporting items for systematic reviews and meta-analysis have developed an extension for scoping reviews (PRISMA-ScR) 22-item checklist will also be utilised in this study<sup>31</sup>.

#### **Step 1: Identifying the research question**

The "PCC" mnemonic (population, concept and context) was used to develop a clear title and research question<sup>33</sup>. In order to capture the most appropriate body of literature we iteratively searched the literature and revised search terms which resulted with the main concept of communicating messages and principal contextual settings for which the concept will be explored: PA promotion programmes or interventions and the target population as adolescents. Finally, our outcome of interest is

to determine what, who, when, where and how PA messages should be communicated to adolescents.

The following research questions were identified:

1. *What (content), how (mode of delivery/communication) and who/when/where (context) to deliver PA messages to adolescents?*
2. *What methodologies are used to determine the effectiveness of the messages for adolescents? (i.e. an instrument)*
3. *Should a mass media or multi-media communication campaign be included in whole-school PA programmes? (i.e. are they effective?)*

#### **Step 2: Identifying relevant studies**

For comprehensiveness and rigor several databases: [Scopus](#), [EBSCO \(CINAHL, Education source\)](#), [PubMed](#) will be searched. We will also include grey literature such as conference abstracts, theses and reports from the World Health Organisation Global Index Medicus. Table 1 in the *Extended data* gives an overview of the predetermined eligibility criteria i.e., inclusion/exclusion criteria.

#### **Step 3: Study selection**

Using an iterative process we identified and agreed upon a search strategy as a team in collaboration with the faculty librarian in the School of Education and Health Sciences at the University of Limerick (Extended data, Appendix 1)<sup>32</sup>. Firstly, a preliminary search of the literature was conducted on CINAHL searching article titles, abstracts and full texts to guide the development of our second search strategy. Second, we are including the identified keywords and subject headings in the search strategy across all databases being used. Finally, will look at the reference lists from articles selected for the review i.e. snowballing. The librarian provided suggestions and verifications regarding the appropriate syntax and the adaption of search strategies across databases.

Once the searches have been ran in all databases, the search results will be downloaded to [EndNote](#) where duplicates will be removed and then uploaded to [Rayyan](#) review software where if necessary further duplicates will be removed<sup>34</sup>. The title/abstract screening process will be piloted by double screening 10% of retrieved articles (10% by CG and 10% by either KN or EM) and inter-rater reliability calculated for title and abstract screening using kappa statistic. Screening will begin once an agreement rate of 75% or greater by CG and either EM/KN as per pre-determined eligibility criteria. If it is unclear whether or not to include an article based on the first stage of the reviewing process, the study will be included for full-text review to ensure it is not being excluded without full consideration. The same process will be repeated when screening full text articles with reviewers from the research team. The reviewers will meet at multiple stages throughout the reviewing process to discuss any discrepancies that may have emerged. Any discrepancies will be discussed until a consensus is achieved, arbitrated as necessary by a third reviewer.

**Step 4: Preliminary charting elements and associated question**

An Excel table (see *Extended data*, Table 2) will be used to extract and chart the data systematically. The rows will represent the different articles and the columns will provide key details addressed in the article such as, the context, content, mode of delivery, method of measurement, implementation and effectiveness of PA messages. This information is important to note for the next stage of the review process. The piloting process will take place with two or more researchers charting the data independently from the first 5–10 studies and meet to determine whether their approach to data extraction is consistent with the research question and purpose. This stage is an iterative process as new data are presented in the examination stages, leading to continual charting updates.

**Step 5: Collating summarising and reporting the results**

This stage has three clear steps:

## i) Collating and summarising the results

Following data extraction and charting we will provide a narrative synthesis of the included studies, descriptively summarising the data that has been charted. We will not critically appraise the data; we will look to aggregate the findings of the included studies allowing us to summarise and identify recurring themes. These themes will be reported qualitatively and displayed in a way which answers the proposed research question and objectives.

## ii) Reporting the results

Results will be reported using the PRISMA-ScR guidelines and a PRISMA flow diagram will be included to show all studies selected or excluded at each stage<sup>35</sup>. Findings will be organised into categories such as aims, methodological design, key findings and gaps in the literature but also by categories that specifically highlight theoretical and operational linkages such as context, conceptual and operational features and measurements used.

## iii) Research implications for future research, practice and policy

By understanding how PA messages are delivered in what context and by whom will help inform the development of a PA messaging framework for adolescents. The broader implications of the findings for policy, practice and research will be highlighted.

**Step 6: Consultation with knowledge users**

Levac *et al.* suggested this stage should be essential, after Arksey and O'Malley deemed it as optional, as it adds to the methodological rigour of a study<sup>30,32</sup>. Since this review is a part of a study on effective PA communication for adolescents, we will utilise an existing partnership between researchers, knowledge users and post-primary schools. This collaboration initially began in 2018 where formative participatory research took place with the University of Limerick researchers, and the students, teachers, parents and sports coaches in Irish post-primary schools.

The format for consulting with stakeholders will follow a participatory approach in the style of a workshop with focus

group discussions. It will include opportunities for learning and action using tools for presenting the results of the scoping review and discussion between stakeholders about any potential modifications regarding how the literature defines, measures and operationalises effective communication with adolescents. The purpose of this consultation is to share preliminary findings with stakeholders, validate the findings i.e. ensure they have practical relevance and to inform a draft effective PA communication for adolescent's toolkit. A further series of consultation phases will take place with additional stakeholders as part of a follow-up study i.e. a modified delphi study.

**Discussion**

The school is an ideal PA promoting setting, whole-of-school programmes and Physical Education curricula play a large role in the way PA is communicated to adolescents<sup>11,36</sup>. Previous literature highlights the importance and greater effectiveness of portraying PA as fun and enjoyable to children and adolescents rather than stating the health-related benefits of PA<sup>16</sup>. This review aims to map and synthesis the available literature in relation to the specific content of PA messages that is deemed acceptable by adolescents, the delivery of the message i.e. the most appropriate personnel and the method in which it is communicated e.g. multi-media campaign and the environment in which the messages are communicated e.g. whole school PA programmes. The findings from this review will guide the direction of future research with adolescents to identify an effective communication strategy for PA.

**Ethics and dissemination**

Ethical approval was not required or obtained for this scoping review. The scoping review findings will be disseminated in a peer-reviewed journal and the findings will be presented at appropriate academic conferences and to project partners to inform the design of the effective PA communication for adolescent's toolkit. As highlighted above in *Step 6: Consultation with knowledge users* we will share the findings with an array of stakeholders who will have the opportunity to discuss potential modifications for action.

**Data availability****Underlying data**

No data are associated with this article.

**Extended data**

Open Science Framework: Communicating Physical Activity with Adolescents: What works? A scoping review protocol. <https://doi.org/10.17605/OSF.IO/BCNS6><sup>35</sup>

Extended data (available on the OSF registration):

- Table 1. eligibility criteria (pre-determined inclusion/exclusion criteria)
- Table 2. Data charting elements (variables to be extracted from the included studies)
- Appendix 1. Scopus search strategy (complete search strategy in Scopus database)
- Appendix 2. PRISMA-P 2015 checklist

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](#) (CC-BY 4.0).

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databases for this scoping review. We would also like to acknowledge Dr. Enrique García Bengoechea for his feedback on the overall concept of the topic and as part of the wider supervisory team. Finally, the authors would also like to acknowledge the Post-primary Active School Flag programme, a Department of Education initiative funded by Healthy Ireland for the ongoing support and collaboration. Findings from the Post-primary Active School Flag feasibility study contributed to the conceptualisation of this study.

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## Open Peer Review

Current Peer Review Status:  

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### Version 1

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 **Leanne C. Doherty** 

The Centre for Exercise Medicine, Physical Activity and Health, Sport and Exercise Sciences Research Institute, Ulster University, Coleraine, UK

#### ***Is the rationale for, and objectives of, the study clearly described?***

Yes. The authors adequately outlined the problem of physical inactivity in this cohort of adolescents and the need to identify effective techniques to communicate with them, to promote physical activity, and in turn impact behavior. This research is very relevant given the rate of obesity and physical inactivity globally.

#### ***Is the study design appropriate for the research question?***

Yes. The authors clearly explained the difference between a scoping review and a systematic review and clearly justified their choice of undertaking a scoping review.

#### ***Are sufficient details of the methods provided to allow replication by others?***

Yes. The authors clearly outline how they will adhere to the methodological framework for conducting scoping reviews. I was easily able to access the supplementary files regarding eligibility criteria, data charting elements, and Scopus search strategy. I think the reporting plan is very appropriate and given the data will be organised by categories and linked to the review objectives, the results will be well-structured and easy to follow. This will aid the reader when relating the findings to the stated objectives.

#### **Additional comments**

I have one comment regarding the inclusion criteria. Your population/sample will include adolescents in post-primary schools, yet the review is not limited to the school setting. Would it, therefore, be more beneficial to replace "in post-primary schools" with the appropriate age range? Some adolescents leave the post-primary setting at 15/16 years of age to move into other Further

Education facilities.

**Is the rationale for, and objectives of, the study clearly described?**

Yes

**Is the study design appropriate for the research question?**

Yes

**Are sufficient details of the methods provided to allow replication by others?**

Yes

**Are the datasets clearly presented in a useable and accessible format?**

Not applicable

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Human Nutrition, Physical activity and Health research.

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Reviewer Report 26 August 2022

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**Matthew Mclaughlin** 

Telethon Kids Institute, The University of Western Australia, Callaghan, NSW, Australia

**Is the rationale for, and objectives of, the study clearly described?**

Yes, the study outlines the need for a review in this population of messaging/communicating physical activity. I particularly enjoyed the succinct writing style, kudos to the authors for packing a lot of information into such a short paper.

**Is the study design appropriate for the research question?**

Yes, a sufficient rationale for a scoping review is provided (e.g. compared with a systematic review).

**Are sufficient details of the methods provided to allow replication by others?**

Yes, the tables will be particularly useful for replication purposes. Although the clear use of scoping review methodologies and checklists is also to be commended.

**Are the datasets clearly presented in a useable and accessible format?**

Yes, this is a protocol.

**Major comments**

Overall this is an excellent protocol and I am confident it will be a useful contribution to the literature. I only have one question/idea/suggestion, which may have been considered already, but I'd be keen to see the authors thoughts: Can the authors provide more detail on the grey literature they plan to search and what strategy they will follow? I ask because the description in Table 1 implies that government reports, websites, books etc. will not be searched. I imagined there would be some publicly available reports from government and NGO's that may have conducted campaigns? Anyway, just a thought! Not a dealbreaker for this protocol. Just a possible way to boost the number of included articles.

**Is the rationale for, and objectives of, the study clearly described?**

Yes

**Is the study design appropriate for the research question?**

Yes

**Are sufficient details of the methods provided to allow replication by others?**

Yes

**Are the datasets clearly presented in a useable and accessible format?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Physical activity, young people, reviews, interventions, scale-up.

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Author Response 04 Dec 2022

**Caera Grady**, University of Limerick, Limerick, Ireland

The authors would like to thank Dr Matthew McLaughlin for taking the time to review this manuscript and for providing positive and constructive feedback. We acknowledge the point about the grey literature search strategy and have taken this into consideration. Please note that we did not exclude government reports however, for feasibility and capacity reasons, we decided to only search databases that index grey literature as opposed to conducting an extensive search of the grey literature.

**Competing Interests:** There are no competing interests to disclose.