

---

# *Physical Activity Communication: A Scoping Review of the Literature*

Caroline D. Bergeron, DrPH<sup>1</sup>  
Andrea H. Tanner, PhD<sup>2</sup>  
Daniela B. Friedman, PhD<sup>2</sup>  
Yue Zheng, PhD<sup>3</sup>  
Courtney S. Schrock, MPH<sup>4</sup>  
Daniel B. Bornstein, PhD<sup>5</sup>  
Michelle Segar, PhD<sup>6</sup>  
Natalie Swift, MMC<sup>2</sup>

*Engaging in regular physical activity can help prevent chronic disease and enhance quality of life. Unfortunately, less than 20% of American adults meet the recommended physical activity guidelines, perhaps indicating ineffective communication efforts around physical activity. In preparation for the release of the second edition of the Physical Activity Guidelines for Americans, and using the physical activity guidelines as a cornerstone of our approach, we conducted a scoping review of physical activity communication research to understand the scholarly efforts related to communicating about physical activity. Using a social-ecological perspective, we identified studies using the keywords physical activity\* OR exercise\* AND health communication\* in three public health and communication databases and retained studies conducted in the United States and published in English from 1995 through 2015. Sixty-seven articles included a mention of physical activity guidelines, a health communication focus, and media channels used in promoting physical activity. Half of the studies were published in health/science communication journals. One third of the studies mentioned physical activity guidelines.*

*Only 19% of the studies featured mental health benefits of physical activity while more than 64% emphasized physical health benefits. Nearly all the studies (96%) mentioned the use of persuasion to encourage engagement in physical activity. More effort is needed to study the influence of communicating physical activity guidelines to the public. Best practices for future physical activity communication are discussed for both researchers and practitioners.*

**Keywords:** health communication; health promotion; exercise; behavior change

<sup>1</sup>Bexar County Community Health Collaborative, San Antonio, TX, USA

<sup>2</sup>University of South Carolina, Columbia, SC, USA

<sup>3</sup>California State University Northridge, Los Angeles, CA, USA

<sup>4</sup>Department of Health and Human Services, Rockville, MD, USA

<sup>5</sup>The Citadel, Charleston, SC, USA

<sup>6</sup>University of Michigan, Ann Arbor, MI, USA

## Health Promotion Practice

Month XXXX Vol. XX, No. (X) 1–10

DOI: 10.1177/1524839919834272

Article reuse guidelines: [sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)

© 2019 Society for Public Health Education

**Authors' Note:** We would like to thank members of the National Physical Activity Plan Communications Committee for their expert review of our analyses. Address correspondence to Caroline D. Bergeron, Director of Research and Evaluation, Bexar County Community Health Collaborative, 3010 North St. Mary's Street, Suite 1101, San Antonio, TX 78212, USA; e-mail: [caroline.bergeron@healthcollaborative.net](mailto:caroline.bergeron@healthcollaborative.net)

## ► INTRODUCTION

Physical inactivity is a major public health concern (Blair, 2009). Sedentary lifestyles have been associated with an increased risk for chronic disease, morbidity, and mortality (Biswas et al., 2015). As a result, researchers and practitioners have developed a number of programs and guidelines to provide individual-level recommendations on the types and amounts of physical activity that should be regularly achieved to improve health (Blair, LaMonte, & Nichaman, 2004). In 2008, the U.S. Department of Health and Human Services released the first edition of the *Physical Activity Guidelines for Americans*, a federal science-based guiding document that provides recommendations for physical activity from a social-ecological perspective. These guidelines recommend that adults engage in at least 150 minutes of moderate intensity physical activity per week (Office of Disease Prevention and Health Promotion, 2018). Despite four decades of physical activity recommendations, only 20% of American adults meet the 2008 guidelines (Healthy People 2020, 2014a), suggesting a need to be more strategic in discussing physical activity to the general population (Segar, Taber, Patrick, Thai, & Oh, 2017).

In preparation for the release of the updated physical activity guidelines in November 2018, the Communications Committee of the U.S. National Physical Activity Plan (NPAP) Alliance recognized the need for this scoping review to inform national policies and strategies for communicating about physical activity.

Effectively communicating the importance of physical activity is crucial to increase awareness among policymakers, stakeholders, and the general population (NPAP Alliance, 2010; Segar et al., 2017). Physical activity communication can help build knowledge and skills about the health and social benefits of physical activity and the variety of ways by which to engage in physical activity (Healthy People 2020, 2014b), change attitudes and facilitate decision making (Healthy People 2020, 2014b), promote overall physical activity in the community (NPAP Alliance, 2010), and translate research into physical activity policies (Stamatakis, McBride, & Brownson, 2010). For this scoping review, we used the social-ecological model as our theoretical framework because physical activity communication represents a dynamic and complex interplay between individuals, their relationships, the community, and other societal factors (Bronfenbrenner, 1994).

The purpose of this scoping review is to inform health promotion researchers and practitioners of the current evidence base regarding communication of physical activity and physical activity recommendations in the

United States. Three primary objectives that we employed to guide this study were (1) to identify and synthesize the existing literature focusing on communication related to physical activity, (2) to pinpoint existing gaps in the literature, and (3) to identify evidence-based best practices for communicating about physical activity.

## ► METHOD

We conducted a scoping review to examine the existing literature on physical activity and health communication in terms of its nature, characteristics, and volume and to identify any knowledge gaps (Pham et al., 2014). We followed the protocol of the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) including the PRISMA checklist and diagram (Tricco et al., 2018). We ran a separate online database search of PubMed, Communication & Mass Media Complete (EBSCOHost), and Communication Abstracts (EBSCOHost), three of the most widely used academic databases in the fields of public health and communication and included the following text search specifications: *physical activity\** OR *exercise\** AND *health communication\**. As illustrated in Figure 1, initially we identified a total of 481 articles from the databases. The review process included two levels: Level 1 screening was used to review abstracts; Level 2 screening was used to review the full articles for their eligibility. After selecting eligible articles, we used both levels of screening to review the full articles' reference lists and identify other articles for possible inclusion.

### *Study Selection*

To be included, articles needed to describe empirical research studies that were conducted in the United States and published in English from 1995 through January 2015. We selected the year 1995 to match the historical moment when the Centers for Disease Control and Prevention (CDC) in conjunction with the American College of Sports Medicine (ACSM) released their first physical activity recommendation (Office of Disease Prevention and Health Promotion, 2007). We ended the review in early 2015 to disseminate the results to the Communications Committee of the U.S. NPAP Alliance and inform their process as they were preparing for the second iteration of the NPAP later that year. Another inclusion criterion required data on both physical activity and health communication including media and mass communication methods. As the focus was to understand how physical activity is promoted via health communication, we excluded articles that

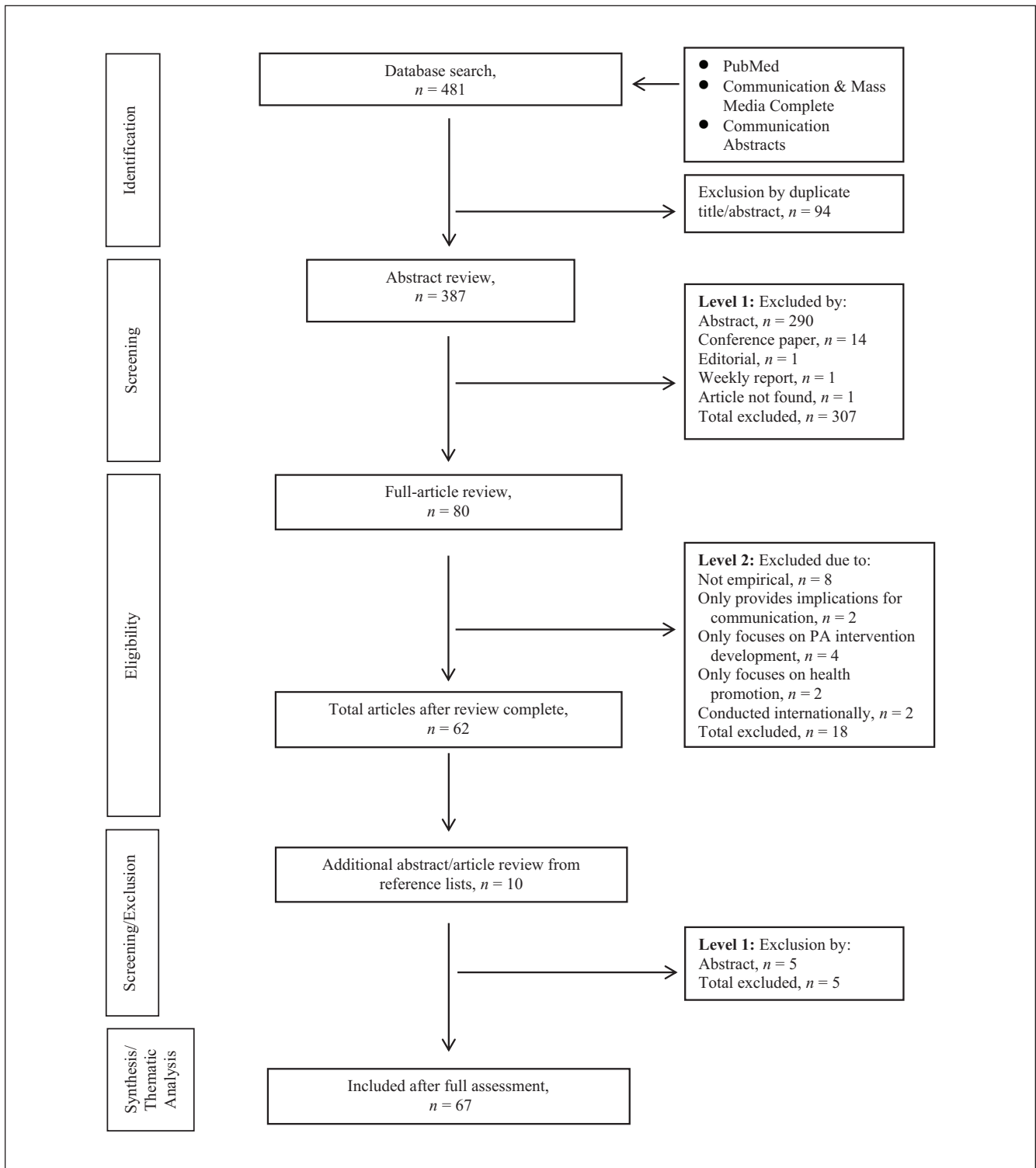


FIGURE 1 Flowchart for Scoping Review

focused only on physical activity intervention development or only provided implications for communication. While much valuable research has been conducted outside the United States, our inclusionary criteria only included studies conducted in the country to meet the needs of the Communications Committee.

### **Data Extraction and Synthesis**

A research team conducted the scoping review and identified 481 articles from three databases. The research team excluded duplicate titles and abstracts and invited two coders from the team to conduct a Level 1 review of the remaining 387 abstracts. During this phase, 307 articles were excluded for not meeting our inclusion criteria. After discussion and selection by the team, the two coders conducted a Level 2 review of the remaining 80 articles. Coders first reviewed 19 (25%) of the articles and reported high intercoder reliabilities, by using a 24-item coding form that specified the year of publication (Scott's  $\pi$  [ $\pi$ ] = 1), journal type ( $\pi$  = 1), research methods used ( $\pi$  = .963), use of theories (open-ended question), use of physical activity terms in the title ( $\pi$  = 1) and article ( $\pi$  = .877), mention of physical activity guidelines ( $\pi$  = .927), mention of using physical activity in health promotion ( $\pi$  = .948), associated health conditions ( $\pi$  = .982), benefits of physical activity ( $\pi$  = .929), focus of the communication ( $\pi$  = .880), type of health communication ( $\pi$  = .948), type of media channels ( $\pi$  = .904), as well as demographic of the study participants ( $\pi$  = .908). The coders also gathered and summarized information about the study findings and their recommendations. The full research team regularly reviewed and discussed the coders' progress. Once intercoder reliability was reached, each coder then independently reviewed the remaining 75% of the articles. The coders summarized all the data from the articles in a spreadsheet in Microsoft Excel, which was discussed and reviewed by the full research team.

After the Level 2 review, 16 of the 80 articles were excluded: Six were not empirical, two only provided implications for communication, four only focused on physical activity intervention development, two only focused on health promotion, and two were conducted outside of the United States. When reviewing the reference lists, the coders identified 10 additional potentially relevant abstracts. They conducted a second round of Level 1 review and excluded half of the articles that did not focus on both physical activity and communication. The five articles that did meet our eligibility criteria underwent a Level 2 review and were included in the study. In total, 67 articles that examined research findings about physical activity and health communication

in the United States were extracted for the full review. Following the synthesis of these articles, we conducted a qualitative thematic analysis of the 67 articles.

## **► RESULTS**

The majority of physical activity communication articles published between 1995 and 2015 were published after 2006, with a peak in published research in 2013. As shown in Table 1, the research was primarily published in health and science communication journals or public health journals and primarily described surveys, evaluations, and content analyses of program interventions. A majority of studies (68.7%) were grounded in one or more theoretical perspectives and most often referenced well-known theories such as the social cognitive theory, social marketing, the transtheoretical model/stages of change model, the theory of planned behavior, and the self-efficacy theory.

As Table 2 shows, a majority of studies ( $n = 42$ , 62.7%) included both male and female participants. Studies focused on participants from a variety of age-groups, including youth from 9 to 18 years old ( $n = 12$ , 17.9%), adults from 20 to 50 years old ( $n = 32$ , 47.8%), middle-aged adults from 51 to 64 years old ( $n = 15$ , 22.4%), and older adults ( $n = 12$ , 17.9%). A total of seven articles ( $n = 7$ , 10.4%) focused uniquely on youth. A majority of articles (61.2%) included an overlap of participants from different racial and ethnic backgrounds, such as non-Hispanic White ( $n = 34$ , 50.7%), non-Hispanic Black ( $n = 31$ , 46.3%), Hispanic ( $n = 23$ , 34.3%), Asian ( $n = 19$ , 28.3%), other ( $n = 16$ , 23.9%), and mixed race ( $n = 11$ , 16.4%). Few studies focused exclusively on one single race or ethnicity: non-Hispanic Whites exclusively ( $n = 7$ , 10.4%), non-Hispanic Blacks exclusively ( $n = 4$ , 5.9%), Hispanics exclusively ( $n = 1$ , 1.4%), non-Hispanic Asians exclusively ( $n = 1$ , 1.4%), and mixed race exclusively ( $n = 1$ , 1.4%).

### **Defining Physical Activity**

A majority of articles ( $n = 49$ , 73.1%) emphasized general physical activity, typically defined as moderate intensity walking, housekeeping, dancing, playing with a dog, gardening, or mowing the lawn. Nineteen articles (28.4%) emphasized exercise, defined as planned physical activity (Miller, Marolen, & Beech, 2010), which is vigorous enough to cause increased breathing and heart rate. Others focused on proper diet or nutrition ( $n = 21$ , 31.3%), walking ( $n = 13$ , 19.4%), lifestyle activities ( $n = 8$ , 11.9%), less sitting time ( $n = 8$ , 11.9%), formal exercise ( $n = 7$ , 10.4%), group-based fitness ( $n = 3$ , 4.5%), and work-site or employee wellness ( $n = 2$ , 3%).

**TABLE 1**  
**Characteristics of Articles Reviewed (*N* = 67)**

<i>Characteristics</i>	<i>Frequency</i>	<i>%</i>
Focus of journals		
Health/science communication	36	53.7
Public health	21	31.3
Communication	6	9
Physical activity	4	6
Study methodology described <sup>a</sup>		
Survey	39	58.2
Evaluation	29	43.3
Content analysis	22	32.8
Focus group	12	17.9
Mixed methods	12	17.9
In-depth interview	8	11.9
Main theories used <sup>a,b</sup>		
Social cognitive theory	16	23.9
Social marketing	7	10.4
Transtheoretical model/stages of change	7	10.4
Theory of planned behavior	6	9.0
Self-efficacy theory	5	7.5
No theory reported	21	31.3

<sup>a</sup>Some studies reported on multiple categories; numbers and percentages reported reflect overlapping reports. <sup>b</sup>Only the main theories are listed. Other theories that were reported less than five times each include the elaboration likelihood model of persuasion, the exemplification theory, the expectancy value model, the extended parallel process model, the family communication patterns theory, the I-change model, message framing, the precaution adoption process model, the prospect theory, the regulatory focus theory, the self-determination theory, and the theory of normative social behavior.

### ***Physical Activity Guidelines***

One third of the articles ( $n = 24$ , 35.8%) discussed physical activity guidelines. Eight (11.9%) mentioned the physical activity guidelines of Healthy People 2010, seven (10.4%) mentioned the 2007 ACSM/American Heart Association guidelines, five (7.5%) mentioned the Health and Human Services 2008 Physical Activity Guidelines, three (4.5%) mentioned the 1995 CDC/ACSM recommendations, and only one (1.5%) mentioned the U.S. NPAP.

### ***Health Promotion and Physical Activity***

As presented in Figure 2, a majority of the research focused on promoting and persuading individuals to engage in more physical activity ( $n = 64$ , 95.5%), followed by research centered on promoting self-efficacy in physical activity ( $n = 41$ , 61.2%) and providing physical activity education ( $n = 26$ , 38.8%). Fewer

examined monitoring of physical activity ( $n = 9$ , 13.4%), information seeking ( $n = 8$ , 11.9%), planning strategies for physical activity ( $n = 4$ , 6.0%), and developing partnerships for physical activity ( $n = 3$ , 4.5%).

In this scoping review, we also examined the mention of health conditions as they relate to physical activity. A total of 28 articles (41.8%) focused on physical activity as it relates to obesity, six articles (9%) mentioned cancer, five articles (7.5%) mentioned diabetes, four articles (6%) mentioned cardiovascular diseases, four articles (6%) mentioned other health conditions (e.g., arthritis and cognitive decline), and one article (1.5%) mentioned high blood pressure.

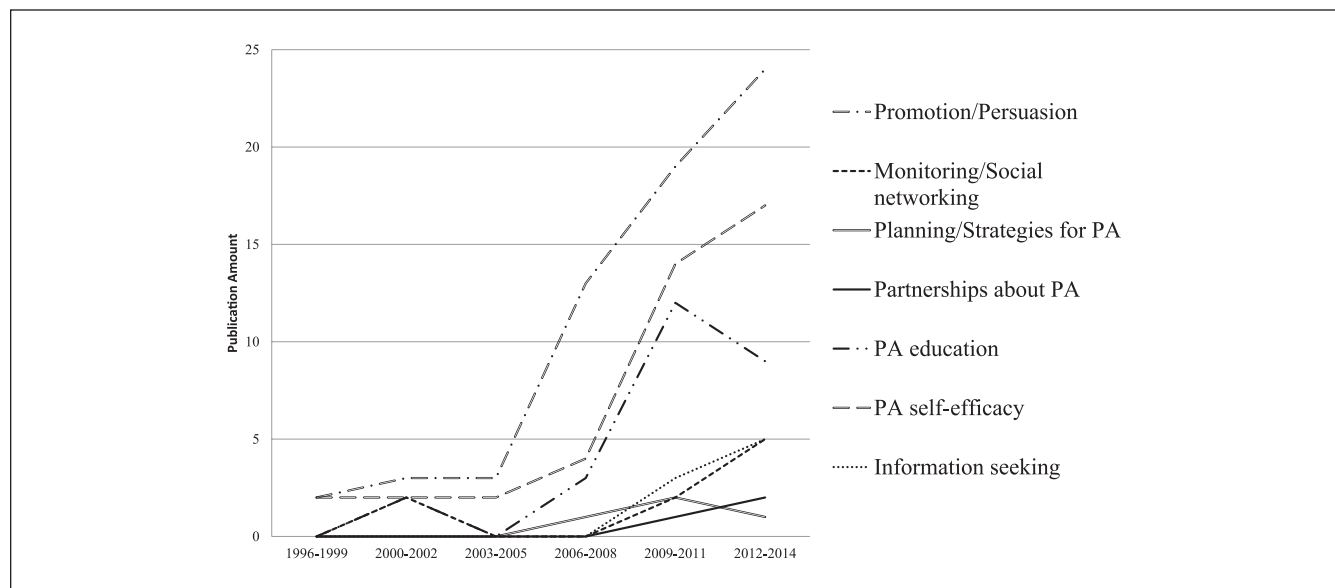
### ***Benefits of Physical Activity***

Articles discussed a range of physical activity benefits, including preventing diseases ( $n = 60$ , 89.6%), losing weight ( $n = 29$ , 43.3%), improving mental health ( $n = 13$ , 19.4%), managing diseases ( $n = 10$ ,

**TABLE 2**  
**Demographics of Participants in the Studies Reviewed (N = 67)**

<i>Demographic Characteristics</i>	<i>Frequency (No. of Studies)</i>	<i>%</i>
<b>Gender</b>		
Both female and male	42	62.7
Female only	13	19.4
Male only	2	3
Did not mention	10	14.9
<b>Multiple ages reported<sup>a</sup></b>		
≤19 years	12	17.9
20-50 years	32	47.8
51-64 years	15	22.4
≥65 years	12	17.9
<b>Multiple races/ethnicities reported<sup>a</sup></b>		
White or Caucasian	34	50.7
Black or African American	31	46.3
Hispanic	23	34.3
Asian or Pacific Islander	19	28.3
Others	16	23.9
Mixed race	11	16.4
Did not mention	13	19.4

<sup>a</sup>Numbers and percentages reported reflect studies with overlapping categories.



**FIGURE 2 Public Health/Health Promotion Focus by Year**  
 NOTE: PA = physical activity.

14.9%), engaging in activities of daily living ( $n = 4$ , 6%), and sports performance ( $n = 1$ , 1.5%).

### **Communication Types and Channels**

Forty-four articles (65.7%) focused on mass media communication (e.g., eHealth), 21 (31.3%) focused on community-based communication (e.g., developing local physical activity campaigns), 13 (19.4%) described interpersonal communication (e.g., consumer-provider interactions), and 5 (7.5%) focused on organizational or institutional communication (e.g., influencing physical activity policies).

The evidence reviewed focused on a variety of media channels to promote physical activity, including websites ( $n = 24$ , 35.8%); newspapers and magazines ( $n = 16$ , 23.9%); small print media, such as pamphlets, brochures, and posters ( $n = 15$ , 22.4%); local TV news stations ( $n = 12$ , 17.9%); advertisements/commercials ( $n = 12$ , 17.9%); radio ( $n = 10$ , 14.9%); cable TV news ( $n = 9$ , 13.4%); social media ( $n = 7$ , 10.4%); entertainment TV ( $n = 6$ , 9%); national broadcast network news ( $n = 4$ , 6%); mobile platforms ( $n = 4$ , 6%); and other types of media ( $n = 13$ , 19.4%). Fifteen articles (22.4%) did not mention media modality.

### **Physical Activity Message Effectiveness and Recommendations**

We conducted a thematic analysis of the studies, which revealed a wide array of findings regarding the effectiveness of communication channels to disseminate physical activity information and overall recommendations to improve physical activity communication.

#### **Theme 1: Digital Communication**

When synthesizing the findings across studies, digital communication emerged as a clear theme regarding the type of communication channel used for message dissemination. Digital communication tools are increasingly being utilized and are, generally, a cost-efficient and effective manner in which to communicate and educate about the importance of physical activity. For example, several studies reported that email was an effective manner by which to deliver physical activity information; other studies reported that individuals preferred web-based programs more than print materials and that web-based interventions were particularly effective in initiating change in physical activity with specific populations, such as older adults. Blogs documenting personal experiences with physical activity also offered others firsthand accounts of their

experiences. In contrast, only two studies suggested that printed materials (e.g., workbooks or billboards) helped increase physical activity intentions and behaviors, and studies stated that newspapers were rarely used to disseminate stories about physical activity.

#### **Theme 2: Overall Content**

Another theme that emerged from the data focused on the content of the messages and the type of content that should be used for maximum effectiveness. Researchers and practitioners can use visual content, such as photographs or video in television ads, as they were found to be effective in illustrating the resources needed for engaging in physical activity. Including culturally relevant images was crucial to effectively disseminate physical activity information to priority populations, as was exposure to the same message from multiple media sources. The perceived quality of the information conveyed also contributed to message effectiveness.

Recommendations were also offered across studies to improve physical activity communication. Broad research recommendations included studying (1) the exact features that are critical to disseminate physical activity interventions in the media (e.g., perceived credibility of the message, use of theoretically tailored information), (2) the cost-effectiveness of using current and emerging media for physical activity interventions, (3) the interaction effects of message framing and source credibility for physical activity outcomes, and (4) the directionality of peer support and physical activity behaviors. Across studies, qualitative research was recommended as a method to explore the cultural, social, and contextual resources related to physical activity.

Practice recommendations included (1) describing how to conduct effective promotional campaigns for physical activity, (2) enhancing the impact of a campaign by using multiple modalities and repeating the physical activity message through various channels, and (3) obtaining assistance from health educators and advocates to write physical activity stories with journalists.

## **► DISCUSSION**

We provided an overview of empirical research focusing on the communication of and about physical activity. This scoping review uses a social-ecological perspective because communication about physical activity in itself represents these dynamic interactions of factors across levels of society, including relationships,

organizations, and policy. It is from this perspective that we also provide insights on key features of these studies and best practices to follow.

### ***Implications for Research***

Only one third of all articles mentioned physical activity guidelines. Researchers do not appear to be studying the guidelines, the context where they are recommended, nor the effects of communicating about these formal recommendations to the public. These guidelines serve to educate the public on the amount of physical activity beneficial for good health and serve as a resource for health professionals and policymakers to promote healthy behaviors and advocate for active living and healthier environments (2018 Physical Activity Guidelines Advisory Committee, 2018). While the lack of reference to the guidelines represents a gap in the literature, other research suggests that emphasizing guidelines in physical activity communication may not effectively increase knowledge (Kay, Carroll, Carlson, & Fulton, 2014) and might not be an optimal messaging strategy to motivate physical activity among the public. Researchers are encouraged to investigate further potential effects of communicating about and framing physical activity guidelines in different ways (e.g., “everything counts” vs. traditional threshold messages; Segar et al., 2017). This recommendation is especially important now that the second edition of the Physical Activity Guidelines for Americans was recently released. In addition, researchers are invited to explore and better understand the conditions under which the federal physical activity guidelines are being implemented.

The literature primarily linked physical activity with obesity. While physical inactivity is one of the most important risk factors for obesity (Church et al., 2011), the articles rarely communicated about physical activity for other health conditions. Physical activity can contribute to the prevention of cancer (Clague, & Bernstein, 2012), diabetes (Sigal et al., 2013), and heart disease (Shiroma, & Lee, 2010) and improved mental illness and mood (Maher et al., 2013), among others. Thus, future health promotion researchers conducting physical activity communication research should investigate a broader range of benefits from physical activity. Moreover, given that affective benefits (e.g., feelings, mood) appear to be among the strongest motivators of participation (Segar, Guerin, Phillips, & Fortier, 2016), next-stage research should make sure to investigate these and other affective benefits related to enhancing daily quality of life from being active.

A limited number of studies focused uniquely on physical activity communication of minority populations

(e.g., non-Hispanic Blacks, Hispanics). Given their increased risk for morbidity and mortality due to lack of sufficient physical activity (Mendoza-Vasconez et al., 2016), researchers are encouraged to prioritize these populations for future physical activity communication studies.

### ***Implications for Practice***

Practitioners can use the results of this scoping review to inform their physical activity messages, including the type of communication channel to use as well as specific communication tactics and elements for messaging. Digital communication, including e-mail, blogs, and web pages are cost-effective, relatively easy to develop, and effectively communicate physical activity information to priority populations. Visuals, including video and photographs, as well as culturally relevant messages should be included. These findings align with previous studies focused on best practices for effective health communication more generally (Bergeron et al., 2016; Friedman et al., 2015; Friedman, Hooker, Wilcox, Burroughs, & Rheume, 2012; Tanner et al., 2016). As studies focused on different age, gender, racial, and cultural groups, we recommend that researchers and practitioners examine the effectiveness of different communication channels and messaging for different groups.

A large percentage of the studies examined in this scoping review used health behavior theory to guide the research. Williams et al. (2011) recommend using theories to guide physical activity communication interventions as they help bring improved physical activity outcomes. Most studies focused on health behavior versus communication, as indicated by the theories used (e.g., social cognitive theory) and the content of the articles (e.g., diet). While we reported on the existence of a theoretical framework, we did not compare whether the physical activity communication was more effective with or without the presence of a theory. Future research should explore this key point and investigate the potential of some theories being more effective and useful than others.

This scoping review suggests a need for more communication-focused physical activity studies, especially those that pay attention to the benefits featured, type of media, the message strategy, the source’s credibility, reach, and cost-effectiveness. Future studies should be published in physical activity and public health journals to better promote evidence-based recommendations to the specific practitioners who promote and disseminate information about physical activity to their priority populations. Furthermore, we recommend greater



cross-disciplinary collaboration in researching more effective physical activity framing and communication strategies. Experts from the communication and public health fields can work together using theory, strategies, and methods from both fields to more strategically address the complex psychosocial processes involved in communicating, promoting, disseminating, and ultimately cultivating the adoption of physical activity.

### **Limitations**

This study has limitations. We restricted the search terms to *physical activity\** OR *exercise\** AND *health communication\**. We may have obtained different results if we had included *communication\** rather than the term *health communication\**. We narrowed the search to studies available only in three online academic databases. We may have been able to retain more articles if we had looked in other common public health and health communication databases. However, considering that the purpose was to conduct a scoping review of physical activity communication literature and not a systematic review, we are confident that we obtained a good variety of articles (Armstrong, Hall, Doyle, & Waters, 2011). Studies retained were published from 1995 to January 2015; however, digital communication continues to evolve daily. Researchers and practitioners may need to consider how to put these recommendations into practice with emerging communications technology. Data extracted from the studies did not include sample sizes for study participants. We neither examined specifically how public health theories were incorporated into communication nor examined if the presence of a theory resulted in greater physical activity engagement. In addition, we did not evaluate the effectiveness of certain channels and messages for various types of audiences. The extent to which persuasive communication about physical activity motivates Americans to exercise and improve their health was not studied. These limitations represent important areas for future research. Finally, the 24-item coding sheet that we used for this scoping review did not include health communication frames. An analysis of the framing of the communication in terms of gains and losses would have provided a better understanding of how persuasion may have been used in physical activity communication research to influence physical activity attitudes, intentions, and behaviors (Gallagher & Updegraff, 2012).

### **► CONCLUSIONS**

Health promotion researchers and practitioners are encouraged to use an array of communication strategies

and methods to help increase physical activity participation in future studies and public health interventions, programs, and policies. Collaborating with communication specialists may also help more effectively frame physical activity to the nation as a whole as well as for specific priority populations. Scientists should also consider publishing their physical activity communication research in scientific journals that focus on physical activity and public health to increase its reach among researchers, practitioners, and policymakers. Ultimately, this scoping review showed that much has been learned and that much remains to be examined to more effectively use physical activity communication to motivate an active and healthy American society.

### **REFERENCES**

- 2018 Physical Activity Guidelines Advisory Committee. (2018). *2018 Physical Activity Guidelines Advisory Committee scientific report*. Washington, DC: U.S. Department of Health and Human Services.
- Armstrong, R., Hall, B. J., Doyle, J., & Waters, E. (2011). "Scoping the scope" of a Cochrane review. *Journal of Public Health, 33*, 147-150.
- Bergeron, C. D., Friedman, D. B., Sisson, D. C., Tanner, A., Kornegay, V. L., Owens, O. L., . . . Patterson, L. L. (2016). Awareness, perceptions, and communication needs about the Affordable Care Act across the lifespan. *American Journal of Health Education, 47*, 108-116.
- Biswas, A., Oh, P. I., Faulkner, G. E., Bajaj, R. R., Silver, M. A., Mitchell, M. S., & Alter, D. A. (2015). Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: A systematic review and meta-analysis. *Annals of Internal Medicine, 162*, 123-132.
- Blair, S. N. (2009). Physical inactivity: The biggest public health problem of the 21st century. *British Journal of Sports Medicine, 43*, 1-2.
- Blair, S. N., LaMonte, M. J., & Nichaman, M. Z. (2004). The evolution of physical activity recommendations: How much is enough? *American Journal of Clinical Nutrition, 79*, 913S-920S.
- Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education, 3*(2), 37-43.
- Church, T. S., Thomas, D. M., Tudor-Locke, C., Katzmarzyk, P. T., Earnest, C. P., Rodarte, R. Q., . . . Bouchard, C. (2011). Trends over 5 decades in US occupation-related physical activity and their associations with obesity. *PLoS One, 6*, e19657. doi:10.1371/journal.pone.0019657
- Clague, J., & Bernstein, L. (2012). Physical activity and cancer. *Current Oncology Reports, 14*, 550-558.
- Friedman, D. B., Hooker, S. P., Wilcox, S., Burroughs, E. L., & Rheaume, C. E. (2012). African American men's perspectives on promoting physical activity: "We're not that difficult to figure out!" *Journal of Health Communication, 17*, 1151-1170.
- Friedman, D. B., Toumey, C., Porter, D. E., Hong, J., Scott, G. I., & Lead, J. R. (2015). Communicating with the public about environmental health risks: A community-engaged approach to dialogue about metal speciation and toxicity. *Environment International, 74*, 9-12.

- Gallagher, K. M., & Updegraff, J. A. (2012). Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine, 43*, 101-116.
- Healthy People 2020. (2014a). *Health communication and health information technology*. Retrieved from <http://www.healthypeople.gov/2020/topics-objectives/topic/health-communication-and-health-information-technology>
- Healthy People 2020. (2014b). *Physical activity*. Retrieved from <http://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity>
- Kay, M. C., Carroll, D. D., Carlson, S. A., & Fulton, J. E. (2014). Awareness and knowledge of the 2008 physical activity guidelines for Americans. *Journal of Physical Activity & Health, 11*, 693-698.
- Maher, J. P., Doerksen, S. E., Elavsky, S., Hyde, A. L., Pincus, A. L., Ram, N., & Conroy, D. E. (2013). A daily analysis of physical activity and satisfaction with life in emerging adults. *Health Psychology, 32*, 647-656
- Mendoza-Vasconez, A. S., Linke, S., Muñoz, M., Pekmezi, D., Ainsworth, C., Cano, M., . . . Larsen, B. A. (2016). Promoting physical activity among underserved populations. *Current Sports Medicine Reports, 15*, 290-297.
- Miller, S. T., Marolen, K. N., & Beech, B. M. (2010). Perceptions of physical activity and motivational interviewing among rural African-American women with type 2 diabetes. *Women's Health Issues, 20*, 43-49.
- National Physical Activity Plan Alliance. (2010). *The plan*. Retrieved from <http://www.physicalactivityplan.org/theplan.php>
- Office of Disease Prevention and Health Promotion. (2007). *Historical overview of physical activity recommendations*. Retrieved from <http://health.gov/paguidelines/meetings/200706/historical.aspx>
- Office of Disease Prevention and Health Promotion. (2018). *Physical activity guidelines: Adults*. Retrieved from <http://health.gov/paguidelines/guidelines/adults.aspx>
- Pham, M. T., Rajic, A., Greig, J. D., Sargeant, J. M., Papadopoulos, A., & McEwen, S. A. (2014). A scoping review of scoping reviews: Advancing the approach and enhancing the consistency. *Research Synthesis Methods, 5*, 371-385.
- Segar, M. L., Guérin, A., Phillips, E., & Fortier, M. (2016). From a vital sign to vitality: Selling exercise so patients want to buy it. *Translational Journal of the American College of Sports Medicine, 1*(11), 97-102.
- Segar, M. L., Taber, J. M., Patrick, H., Thai, C. L., & Oh, A. (2017). Rethinking physical activity communication: Using focus groups to understand women's goals, values, and beliefs to improve public health. *BMC Public Health, 17*, 462.
- Shiroma, E. J., & Lee, I.-M. (2010). Physical activity and cardiovascular health lessons learned from epidemiological studies across age, gender, and race/ethnicity. *Circulation, 122*, 743-752.
- Sigal, R. J., Armstrong, M. J., Colby, P., Kenny, G. P., Plotnikoff, R. C., Reichert, S. M., & Riddell, M. C. (2013). Physical activity and diabetes. *Canadian Journal of Diabetes, 37*(Suppl. 1), S40-S44.
- Stamatakis, K. A., McBride, T. D., & Brownson, R. C. (2010). Communicating prevention messages to policy makers: The role of stories in promoting physical activity. *Journal of Physical Activity & Health, 7*(Suppl. 1), S99-S107.
- Tanner, A., Bergeron, C. D., Zheng, Y., Friedman, D. B., Kim, S., & Foster, C. (2016). Communicating effectively about clinical trials with African American communities: A comparison of African American and White information sources and needs. *Health Promotion Practice, 17*, 199-208.
- Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., . . . Hempel, S. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine, 169*, 467-473.
- Williams, D. M., Papandonatos, G. D., Jennings, E. G., Napolitano, M. A., Lewis, B. A., Whiteley, J. A., . . . King, A. C. (2011). Does tailoring on additional theoretical constructs enhance the efficacy of a print-based physical activity promotion intervention? *Health Psychology, 30*, 432-441.