Critical Issues and Trends: Culture Change; Health Promoting Community Design

The Influence of the Media Environment on Physical Activity: Looking for the Big Picture

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You gotta be real careful if you don't know where you're going, 'cause you might not get there.

Yogi Berra[1]

INTRODUCTION

Concern about the obesity epidemic in America—and in many other nations—has galvanized health professionals, advocacy organizations, public policy makers, and ordinary citizens to demand action. Knowing precisely what actions to call for, however, is another matter. Many factors in contemporary life have been implicated—factors related to both increased caloric intake and decreased caloric output—but a coherent explanation of their relative importance, and mutability, has been slower to develop.

In this paper, I examine one of these factors, the media environment, in an attempt to better understand its influence on one mechanism hypothesized to be underlying the obesity epidemic, decreased physical activity. Even this modest undertaking, however, is fraught with uncertainty because of a paucity of evidence. Although firm conclusions and action-oriented recommendations are the objective of this review, the state of the evidence may be better suited to starting a discussion than to ending it.

This paper is organized into four sections. The first two sections examine trends in physical activity and the media environment, respectively, in the United States over the past several decades. The third section examines opportunities to influence the media environment for the purpose of promoting physical activity. The final section presents research questions, the answers to which will enhance our certainty as to the best path forward.

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AN OVERVIEW OF PHYSICAL ACTIVITY TRENDS IN AMERICA

Most people think of physical activity as exercise. Physical activity can be operationally defined as ''movement of the human body that results in the expenditure of energy at a level above the resting metabolic rate.''[2] This definition encompasses a wide range of activities including purposive exercise, leisure-time physical activity, occupation-related activity, transportation-related activity, and household-related activity.

Recent comprehensive reviews by Brownson and colleagues[3] and The National Academies[4] concluded that there has been a marked overall decrease in physical activity in the United States during the past half century. The specifics of the decrease are nuanced, however, highlighting the need for a comprehensive model of physical activity to better understand its dynamics in contemporary life.[5]

Despite public perceptions to the contrary, rates of purposive exercise among adults have improved slightly over the past two decades. National Health Interview Survey data show an approximately 8-point increase (from 22% to 30%) in the proportion of adults achieving recommended levels of physical activity between 1985 and 1998,[4] and Behavioral Risk Factor Surveillance Survey data show an approximately 6-point decrease (from 30% to 24%) in the proportion of adults who reported no leisure-time physical activity between 1994 and 2004.[6]

There may also have been a recent increase in at least one category of transportation-related physical activity. The proportion of short trips—1 mile or less—walked (as opposed to driven) increased by approximately 4 percentage points (from 17% to 21%) between 1995 and 2001.[7]

Conversely, between 1950 and 2000, the prevalence of high-activity jobs in the workforce decreased by 8 percentage points, the prevalence of low-activity jobs increased by 19 points, and the proportion of the population living in suburbia—who therefore have less access to shops within walking distance—increased by 27 points.[3] Between 1960 and 2000, the proportion of trips to work involving walking and public transit declined by 7 and 9 points, respectively. And between 1965 and 1995, women spent significantly less time on household activities requiring physical activity (including

cleaning, laundry, and meal preparation and cleanup), shopping, and child care, decreasing time spent in these activities from about 40 to about 27 hours per week, whereas men increased time spent in these activities only modestly.[8]

Children's physical activity trends are somewhat less clear, which may be, in part, because there are fewer sources of long-term tracking data. Some indicators of purposive exercise are relatively stable over the past few decades, whereas others show a slight or moderate decline. Youth Risk Behavioral Surveillance System data show that the proportion of high school students who achieved the minimum recommended amount of exercise hovered in a tight range—64% to 66%—between 1993 and 2001, and the proportion of high school students who participated in at least one physical education class per week showed a slight upward trend (from 49% to 52%).[9] Monitoring the Future data—collected with high school seniors between 1979 and 2002, and with 8th and 10th graders between 1991 and 2002—shows flat or slightly increasing rates of vigorous exercise nearly every day or more frequently among 8th-grade boys (stable at 61%) and girls (from 48% to 50%), and modestly declining rates for 10th-grade boys (from 60% to 53%) and girls (from 42% to 40%) and 12th-grade boys (from 50% to 42%) and girls (from 33% to 26%).[10]

As has been the case with adults, the proportion of children taking short trips (1 mile or less) to school on foot appears to have increased modestly, by 4 percentage points (from 31% to 36%), between 1995 and 2001.[7]

The ways that children spend their time outside of school have changed significantly, however. Most importantly, children's lives have become more structured over the past 25 years. Between 1981 and 1997, children ages 3 to 12 experienced a large increase in amount of time they spent each week in structured activities including day care, studying, reading, art, and other school-related activities (366 minutes), personal care (107 minutes), sports and outdoors (73 minutes), and shopping (61 minutes), and a moderate decrease in the amount of time they spent in unstructured play (138 minutes).[11] Moreover, between 1977 and 2001, the proportion of children's (ages 5 to 15) trips to school on foot decreased substantially (from 20% to 12%).[9]

Thus, rates of purposive exercise among adults have improved slightly over the past several decades, but occupation-related and incidental physical activity has waned more significantly over a longer period of time. The situation is less clear for children, but it appears that they may be getting modestly less purposive physical activity and significantly less incidental physical activity. It is useful to keep these patterns and rates in mind when considering the media environment's potential role in driving these changes.

AN OVERVIEW OF THE AMERICAN MEDIA ENVIRONMENT

Unfortunately, the concept of the media environment is ill-defined. Although much has been written about the media environment, rigorous explications of the concept are elusive.[12,13] That said, the literature points to several facets of the media environment that are useful to consider: its delivery platforms and channels; the amount of media consumed through those platforms; the content of the media that is consumed; and the commercial purpose of most media content.[14]

Delivery Platforms and Channels

Over the past four decades, the number of media delivery platforms and channels available to the vast majority of Americans has increased dramatically.[14,15] In the mid-1960s, most Americans had access only to broadcast television, radio, records, in-theater movies, and various forms of print media. Currently, in addition to those options, most Americans also have access to significant new video and audio delivery devices, and an exponentially larger number of channels to play on those platforms. These new delivery options include innovations in real-time television programming (cable and satellite television), television programming on demand (on-demand services and playback devices including videocassette recorders, TiVo, etc.), movies on demand (videocassettes, digital video discs, and pay-per-view), and audio media (compact discs, satellite radio, MP3, etc.). In 2006, most Americans also have personal computers and Internet access to the World Wide Web in their homes, as well as mobile and stationary video game platforms (among certain segments of the population) and mobile phones. And unlike in the mid-1960s, most of these devices can be—and usually are—operated via remote control.

In addition to the proliferation of platforms and channels, there has been an extraordinary growth in their presence—one might even say omnipresence—in our daily lives. Between 1970 and 2005, although the penetration of televisions in American households grew only modestly from 95% to 98%, the average number of televisions in our homes approximately doubled (to nearly 3 per home).[16] Home computers and Internet connections, relatively uncommon a decade ago, are now in the majority of American homes.[17] The omnipresence of media is perhaps most evident in the lives of our children. Roberts and colleagues found that in 1999, 65% of American children had a television in their bedroom; moreover, between 1999 and 2004 the presence of videocassette records, digital video devices, computers, and Internet access in children's bedrooms grew by 50% to 100%.[18]

The availability of media in our cars—with cars serving an ever-larger role in our daily lives—has also grown significantly. Although AM radio was the standard in cars in the mid-1960s, FM radio and music cassettes, and more recently compact disc players, satellite radio, and digital video disc players emerged as standard or common options in most cars.[19]

Although this is more difficult to track, media have become more prevalent in the workplace as well. In 2004, 43% of American adults had access to the Internet at work.[20] Nearly all employees who have access to the Internet at work—specifically, 86%—spend some of their work time on the Internet, averaging 12 hours per week.[21]

Retail sales data show that we are spending increasingly more of our income on media devices and on content. Consumer spending in ''radio and TV stores'' increased over 450% between 1987 and 2001, a period in which America's gross domestic product increased approximately 50%.[22] Total

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:41 354 Cust # 06042848R1

consumer spending on media content grew at approximately twice the rate of gross domestic product growth from 1977 to 2005.[15]

Beyond the growing presence of media in the environments under our personal control, media are increasingly appearing in previously media-free community environments: waiting areas, elevators, restaurants, stores, buses, and subways. Referred to as ''captive audience networks,'' these media delivery systems are becoming more pervasive because they offer their host organizations a new source of revenue.[23,24] To an ever-increasing degree, the world is becoming a screen.

The inescapable conclusion is that media have become pervasive in both our personal and community spaces. We appear to welcome this development, as evidenced by the fact that we are willing to pay for it. Media industry experts predict that the proliferation will continue unabated for the foreseeable future.[15]

To understand the potential impact of these trends on physical activity, two possibilities are worth considering. First, more media in our environment may lead to increased consumption of media, the content of which may somehow influence our thoughts or feelings about physical activity, which, in turn, may somehow influence our level of physical activity. Second, consuming more media—i.e., spending more time consuming
media—may displace time that we previously spent being physically active. These possibilities are considered in the next two sections.

Table 1

Annual Average Hours of Media Use: Total and Selected Media*

	1977	1982	1987	1992	1997	2002	2007 projected
Television	1416	1493	1566	1592	1548	1701	1785
Radio	977	1056	1036	1017	941	994	1098
Print	465	463	462	468	438	410	395
Recorded music	210	175	199	237	264	201	152
Box office	13	13	11	11	12	14	14
Video games	1	18	7	15	34	67	109
Home video	0	2	24	38	49	58	98
Home Internet	0	0	0	3	26	154	216
Interactive television	0	0	0	0	0	2	5
Total	3082	3220	3304	3381	3311	3599	3874

* Source: Veronis, Shuler, Stevenson.[15]

Consumption

As media platforms and channels proliferated in our environment, so too did the amount of time we spent consuming media. Average Americans increased their daily time spent consuming electronic media at home by 17% between 1977 and 2002; estimates are that by 2007 the increase will have grown to 26% (see Table 1). To fully grasp the magnitude of this increase it is helpful to consider the actual number of additional hours of media consumed. Over the course of 2007 (as compared to 1977), average Americans will spend 369 additional hours watching TV, will play 108 additional hours of video games, and will spend over 300 hours consuming commercial media forms that didn't even exist in 1977 (i.e., Internet and home videos). The annual net increase is 792 hours, or more than 2 hours per day.

Where are people finding the time to support these increases in media consumption? Over the past four decades, Americans have gained more than 4 hours per week in additional leisure time as a result of spending less time at work and less time engaged in ''productive'' activities around the home (e.g., cooking, meal cleanup, housecleaning, and other forms of incidental physical activity).[22] Thus, we appear to be investing our newfound leisure time—as well as a considerable amount of previously existing leisure time—in media consumption.

The situation is different for our children. American children (ages 3 to 12) had considerably less leisure time in 1997 than they did in 1981.[11] Their loss of leisure time was accompanied by a large increase in time spent in structured activities. Although children's time spent watching TV declined over several decades—Nielsen data from 1988 to 2003 show the decrease to be approximately 10 minutes per day[25]—this is almost certainly not a valid indicator of children's overall media use because of the introduction of popular new media platforms during this period.

Roberts and colleagues' landmark studies on children's media use conducted in 1999 and 2004 provide important perspectives on this point.[14,18] First, young Americans consume an extraordinary amount of media, averaging approximately 6 hours and 20 minutes per day. Second, although young people's overall rate of media use (i.e., the total time per day devoted primarily to media use) remained more or less constant across both points in time, their propensity to ''media multitask'' (i.e., use more than one form of media at a time) led to an increase in their total media exposure from approximately 7.5 to approximately 8.5 hours per day. Specifically, TV, video, and movie use increased approximately 10 minutes per day, video game use increased over 20 minutes per day, and recreational computer use increased over 30 minutes per day. Lastly, young people who have TVs, video game consoles, or computers in their bedrooms are exposed to approximately 2 hours per day more media than are young people who do not have any of these media platforms in their bedrooms.[14] This unsettling finding is consistent with a growing body of research on the behavioral economics of food consumption.[26,27] Namely, people consume significantly more calories when food is more freely available in the immediate environment. Similar behavioral economic biases, or more newly identified neuroeconomic biases,[28] may predispose people to spend more time consuming media when they are in the presence of more media delivery devices or content.

Communication researchers have long posited that the more time we spend consuming media, the less time we will spend on other productive activities.[29] Called the *displacement hypothesis*, this suggests the possibility that our increasing media consumption may be displacing time we previously devoted to physical activity.

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:41 355 Cust # 06042848R1

Numerous studies have examined the possibility that media use displaces physical activity, although most of these studies have been limited to children. Among the small handful of studies conducted with adults, all have demonstrated a significant negative correlation between media use and physical activity.[30–35] A recent meta-analysis of 54 studies of children's media use and physical activity demonstrated a significant displacement of physical activity by both television and video game use.[36] Specifically, the effect sizes found were −.13 for television use and −.14 for video and computer game use. Several more recently published studies also demonstrate a displacement effect of children's media use on their physical activity,[37,38] although it is important to note that arguably the best of these studies, conducted by Vandewater and colleagues, found only limited support for the hypothesis.[39]

Although not investigating the displacement effect *per se*, a birth cohort study of 1000 children followed for 26 years into adulthood demonstrated that television use during childhood and adolescence significantly predicted lower levels of cardiovascular fitness (i.e., Vo_2max) in early adulthood.[40] Conversely, an intervention to reduce TV and video game use developed by Robinson succeeded in reducing both children's television viewing and body mass index, but had no impact on physical activity or cardiorespiratory fitness.[41]

In short, the preponderance of evidence points to the conclusion that media use does displace a certain amount of physical activity from our lives. This is an appealing conclusion because it has high face validity and it suggests viable solutions to the problem. However, nearly all of these studies have significant methodological limitations. For example, most are cross-sectional in nature. Also, many do not accurately account for people's time or the full range of their media use, and the validity of measures employed is highly variable. The displacement effect appears to be an important mechanism by which the media environment is contributing to the decline in physical activity, but further research that addresses the methodological limitations in the literature is critically needed so that, if it is warranted, we may gain greater confidence in this conclusion.

Content

The influence of media content on health behavior has been the focus of much research. Among young people, media content has been linked to physical aggression, early sexual onset and unprotected sex, and tobacco and other substance use, and more recently to eating behaviors.[42,43] Unfortunately, with the exception of media campaigns developed specifically to promote physical activity (reviewed below), few studies have explored the effects of media content on physical activity.

How might media content influence physical activity? Observational learning—i.e., when people learn new behaviors and emotional responses by watching other people perform the behavior, live or in the media—is widely understood to play a potent and pervasive role in shaping people's health behavior.[44] Media content provides a rich source of modeled behavior. One recent study showed that older children and adolescents who want to look like figures in the media are more likely to be physically active, independent of their other personal and social influences.[45] Beyond this, however, little is known about the presence (or lack thereof) of physical activity modeling in the media or its influence.

Agenda setting, cultivation, and framing are a loosely interconnected set of media effects processes that may also influence physical activity. Agenda setting is a mechanism whereby attention paid by the media to a specific issue suggests to viewers that the issue is worth considering.[46,47] Physical activity, however, has received remarkably little attention by mainstream news. Over a three-decade period (from 1970 to 2001), only 111 nonoverlapping reports on physical activity aired on all networks combined.[48] The agenda-setting effect of sports coverage, sport-themed video games, exercise shows, and reality shows involving physical activity, if any, is unknown.

Cultivation is a process in which biased presentations in the media create biased perceptions of reality among viewers, especially among the heaviest media consumers. For example, heavy viewers of television news are more likely to believe that they live in a violent community.[49] Although studies have documented the impact of cultivation on behaviors related to social capital[49,50] and certain health behaviors,[51,52] there has been no corresponding research examining its influence on physical activity. It is conceivable, for example, that if media depictions of physical activity emphasize extreme exertion or discomfort, heavy media viewers could develop a negative-biased perception of physical activity.

The manner in which an issue is framed in the media can have an influence on how people think and feel about the issue.[53–55] When smoking was framed as an individual choice, for example, there was little popular support for public policy changes to prohibit smoking in public places. Conversely, popular support for policy change emerged when smoking was reframed as an addiction that, in addition to harming the smoker, has serious health consequences for people who are exposed to the secondhand smoke (e.g., children, coworkers).[56] The manner in which physical activity has been framed in the media over the past several decades is not known. Failure to frame physical activity as being, in part, influenced by attributes of the physical environment, for example, could contribute to a perception that inactive people, rather than inactive environments, are the problem.

A particularly insidious change in media content over recent decades is the blurring of the distinctions between news, entertainment, and marketing. One aspect of this evolution is that entertainment programming (and even, in certain cases, news programming) is no longer simply a means to focus viewers' attention on advertisements. With each passing year, product placement—in which marketing appeals are built into the media programming itself—is becoming more common, and is commanding a larger portion of the total marketing budget.[57,58] These blurring distinctions between marketing and programming may—indeed are intended to—heighten the impact of marketing on consumers' behavior. Product categories that may displace physical activity—i.e., telecommunication and Internet; movies, video and music; media; and computers and software—are likely to outspend sporting goods and fitness by more than 20 to 1 (see Table 2).

Beyond the scope of this paper—but clearly relevant to the larger question about the relationship between the media

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:42 356 Cust # 06042848R1

Table 2

Total U.S. Ad Spending, 2004* (in Millions of Dollars)

Rank	Category	Spending	Rank	Category	Spending
1	Automotive	20,518	16	Computers, software	2466
2	Retail	17,285	17	Insurance	2331
3	Telecommunications, Internet, Internet service providers	9059	18	Home furnishing, appliances	2051
4	Medicines and proprietary remedies	8167	19	Real estate	2023
5	Financial services	7344	20	Beer, wine, and liquor	1973
6	Food, beverage, and candy	6840	21	Home supplies and cleaners	1973
7	General services	6270	22	Education	1500
8	Personal care	5528	23	Toys and games	1132
9	Movies, video, and music	5337	24	Hardware/building supplies	992
10	Direct response ads	5245	25	Sporting goods	492
11	Airlines, hotels, travel	5141	26	Pet food and care	451
12	Government, politics, religion	4767	27	Shipping and freight	356
13	Restaurants	4417	28	Gas and oil	353
14	Media	3927	29	Office equipment	334
15	Apparel	2588	30	Cigarettes and tobacco	318

* Excludes Yellow Pages, local radio, spot cable and free-standing inserts. Note: ''Medicines and proprietary remedies'' includes pharmaceutical houses, medicines and proprietary remedies, fitness, eyeglasses, and medical equipment; ''general services'' includes apparel services, business services, beauty shops, doctors, nurses, chiropractors, dentists, hospitals, clinics and medical centers, legal services, rental services, dating services, spectator sporting events, exterminators, and electric and water companies; and ''personal care' includes cosmetics and beauty aids, personal hygiene, hair products, toiletries, hygienic goods, and skin care.

environment and obesity—are bodies of research that demonstrate a relationship between media exposure and less nutritious food choices, and between increases in caloric intake and decreases in metabolic rates during media use.[59–61]

Commercial Purpose

A maxim in the media industry states, ''The role of commercial media is to deliver audiences to advertisers.'' Media companies derive revenue primarily by creating audiences that can be, in essence, rented to advertisers. The larger the audience, and the more desirable the audience (demographically speaking), the more revenue and profit media companies can generate. In 2004, total US advertising spending exceeded $135 billion.[62]

Historically, media companies attempted to grow by attracting a larger share of the market. This has changed in recent years because the rapid growth in the number of media platforms and channels, and the slow growth in the size of our population, has made it difficult for media companies to increase audience sizes. Currently, a more viable path to increased profit is to earn a larger share of the customer's day. Holding our attention twice as long—by successfully competing for our time—is financially equivalent to doubling the size of the audience, because media companies can ''monetize'' the additional time we give them into revenue. Therefore, media companies are aggressively competing for our time, not just with each other, but with all of the other ways in which we might choose to spend that time, including physically active uses of time. Moreover, media companies' largest commercial sponsors, for the most part, produce and advertise products that indirectly promote sedentary behavior (see Table 2).

In summary, it is clear that the media have become dramatically more pervasive in our environment, and we are spending far more time consuming those media. It appears likely that our increased media consumption displaces other ways in which we would be spending our time, including involvement in incidental physical activities. It may also be the case—but this is almost completely untested—that the content of the media we consume influences our activity levels. And lastly, it is clear that media companies are aggressively vying for our time in efforts to earn an ever-larger portion of our day.

OPPORTUNITIES TO INFLUENCE THE MEDIA ENVIRONMENT TO PROMOTE PHYSICAL ACTIVITY

Our less-than-complete understanding of the relationship between physical activity and the media environment notwithstanding, there are some obvious, and some less obvious, opportunities to harness the media to promote physical activity. Building from a social-ecological framework, it is helpful to distinguish these into individual- and environmental-level opportunities.[63]

Individual-Level

Physical Activity Media Campaigns. Many public health organizations have attempted to use the media to promote exercise and physical activity. Cavill and Bauman recently reviewed the peer-reviewed evaluations of 15 mass media physical activity campaigns published between 1970 and 2002 that met certain methodological criteria (i.e., a minimum of a pre-post evaluation design and population sampling).[64]

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:42 357 Cust # 06042848R1

Despite many caveats—including a lack of information about the intensity of the campaign and inconsistent evaluation measures and methods—they found that among the 13 campaigns that measured behavior, five produced significant increases in physical activity, several by 20% or more. Since 2002, two additional campaign evaluations meeting Cavill's criteria have been published; both produced significant increases in physical activity.[65,66]

The Guide to Community Preventive Services currently states that there is insufficient evidence to recommend media campaigns as a means to promote physical activity.[67] However, the Guide cites strong evidence to support ''community-wide campaigns,'' which are characterized as ''large-scale, intense, highly-visible community-wide campaigns with messages directed to large audiences through different types of media'' accompanied by other community-based behavior change components. The Guide also recommends ''point-of-decision'' prompts (e.g., posters in elevator lobbies that suggest taking the stairs rather than the elevator), which can also be characterized as media-based. Taken together, these studies and guidelines suggest that there is considerable potential to use media to promote increases in exercise and other forms of physical activity.

Marketing of Commercial Exercise Products and Services. Noncommercial efforts to promote physical activity in the media are small in comparison to commercial efforts to market exercise products and services. In 2005, the advertising budget for the sporting goods category was approximately $500 million, and the budget for fitness, diet programs, and spas was approximately $200 million (see Table 2). Although the behavioral objectives of commercial marketing typically focus on product or service sales without regard for how the product or service is used once purchased, the significant overlap in interests of industry and physical activity advocates warrants careful consideration of opportunities to collaborate. For example, a significant proportion of free physical activity brochures developed by both commercial and noncommercial sources include some form of advertising.[68] The few studies that have examined the impact of commercial exercise advertising on physical activity antecedents indicate that such ads have the potential to influence both positively and negatively.[69–71] Because of the magnitude of its potential, this opportunity deserves immediate attention.

Marketing Other Products and Services. Even the large marketing budgets associated with commercial physical activity products and services are small in comparison to marketing budgets for other commercial categories. We must not lose sight of the potential of these other commercial categories to promote, or to displace, physical activity.

As discussed above, the media industry's success in marketing its products and services appears to displace time spent in physical activity. There is a small but potentially relevant trend operating in the opposite direction, however: a convergence between media platforms (and content) and physical activities. For example, media players are being tailored for, and targeted to, the exercise market, and several commercially successful video game controllers are specifically intended to provide users with a workout (e.g., Konami's DanceDanceRevolution, Sony's EyeToy). Physical activity advocates should seek to identify ways to accelerate and extend the impact of this trend.

Although hard to quantify, labor-saving devices that reduce incidental physical activity (e.g., leaf blowers, self-propelled lawn mowers, vacuum cleaners) are a large commercial category, especially when automobiles are included. Although there is currently not any significant commercial interest in marketing ordinary household devices (e.g., push mowers) based on physical activity incurred during normal use, physical activity advocates should conduct research to determine whether consumer demand can be generated for such products.

Repositioning Physical Activity in Contrast to Consumer Culture. Critical theorists have noted that commercialism is a dominant element in contemporary American culture today, and one aspect of that culture is an implicit message to ''buy more so that you can be more.''[72,73] This presents both challenge and opportunity for those of us wishing to promote increased levels of incidental physical activity. Incidental physical activity consumes few marketable resources and therefore falls outside the mainstream of consumer culture. Taking your dog for a walk, for example, consumes little in the way of equipment, clothing, or membership fees, and is therefore of little commercial interest.

There may be an opportunity, however, to effectively position incidental physical activity in the minds of the public. Marketing theorists suggest that positioning—how a product, service, or behavior is defined in the minds of the consumer—determines the competitive potential and long-term viability of any commercial offering.[74,75] Currently, incidental physical activity lacks clear positioning—or any positioning—despite advocates' attempts over the past decade to promote moderate physical activity. Thus, there remains an opportunity for advocates to position incidental physical activity in a manner that makes plain its value. Although consumer research is the only reliable means by which to identify its optimal positioning, one intriguing possibility is to position incidental physical activity in direct contrast to consumerism (e.g., ''it's free, physical, and fabulous for you'').

Environmental-Level

Markets. Elsewhere, my colleagues and I have argued that there are opportunities to work within markets to promote adoption of proven approaches to physical activity promotion by commercial interests, employers, schools, health care systems, and nonprofit service providers, and that doing so successfully is a potentially potent environmental-level intervention.[76] With few exceptions, little is known about the extent to which evidence-based approaches to physical activity promotion have been adopted by organizations interested in promoting physical activity, but it is probably safe to say that penetration is low. Cultivating higher rates of market penetration for evidence-based approaches to physical activity promotion in the public, private, and nonprofit sectors is a logical extension of an evidence-based approach to public health, is consistent with ecological approaches to health enhancement, and should be made a high priority.[77] Although marketing and diffusion principles suggest a num-

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:43 358 Cust # 06042848R1

Table 3

Proposed Research Agenda

Media consumption

- Are there behavioral economic or neuroeconomic biases underlying our tendency to consume increasing amounts of media?
  - If so, how can we effectively compensate for these biases?
- Does media consumption displace more physically active ways of spending time?
  - If so, which physically active ways of spending time are being displaced, and to what extent?
  - Are certain population segments particularly prone to this displacement?
- Does reducing media use lead to increases in physical activity?
  - If so, what are the most promising means by which to achieve population-based reductions in media use?

Media content

- How is physical activity portrayed in the media?
  - Is observational learning from media content currently having an impact—positive or negative—on people's levels of physical activity?
  - If so, which media content, and in which segments of the population?
  - Is there bias in media portrayals of physical activity—or of other behaviors that may indirectly influence physical activity—that negatively influences heavy media consumers?
- Will efforts to improve the modeling of physical activity in the media translate into population-based increases in physically active behaviors?
- How is physical activity framed in the media, and has that framing influenced rates of physical activity?
  - Are there alternative frames that—if successfully conveyed—can positively influence population rates of physical activity?
- Can outreach efforts to the news media about physical activity have beneficial agenda setting outcomes?
- Are embedded marketing appeals (i.e., placements of products and services antithetical to physical activity) having a detrimental impact on physical activity?

Commercial considerations

- What options does the media industry have to pursue increased profitability in ways that do not undermine population rates of physical activity?

Promoting physical activity through the media

- What are the most effective ways to use media to promote increased physical activity?
- Are media campaigns a cost-effective way to promote physical activity? If so, who reaps the savings?
- What can be done to accelerate the dissemination and adoption of evidence-based approaches to physical activity promotion (those involving media and otherwise)?

Partnerships with industry

- What are the attributes of commercial marketing appeals that enhance sales as well as beneficial cognitions and emotions associated with physical activity?
- How can we better align commercial interests with public health interests to promote increased levels of physical activity?
- Are there opportunities for physical activity researchers and commercial media developers to partner in the development of media-based products and services that promote physical activity?
- Are there motivations that can be cultivated to promote the sales—and more importantly, the use—of labor-requiring devices?

Positioning

- How should incremental physical activity be positioned with the public to enhance its salience and perceived importance?

Dissemination of proven methods

- How can we increase the rate of adoption of evidence-based approaches to physical activity promotion among organizations in all sectors of society that are already interested in promoting physical activity?
- How can we grow the size of the market of organizations that are interested in promoting physical activity?

Environmental change

- Is there a failure in the market—i.e., information deficits—that warrants intervention to prevent further reductions in population rates of physical activity?
- What is the most effective way to frame the decline in physical activity to promote appropriate individual actions and cultivate support for appropriate modifications in public policy?
- Can outreach to the news media elevate the perceived importance of promulgating active living public policies among members of communities?
- What benefits associated with Active Living by Design policies are people most interested in, and which costs are of greatest concern to them?
- Which segments of the population, and what types of organizations, are most likely to be allies in promoting Active Living policies?

Health Promotion hepr-21-00-08.3d 12/1/07 10:19:43 359 Cust # 06042848R1

ber of practical ways to work within existing market structures to create more activity-conducive community environments, little research has actually been conducted to test these approaches.[78]

The Intersection of Markets and Policy. An economic perspective can potentially be used to argue that the decline in incidental physical activity is, in part, caused by a market failure.[79] Private markets tend to underprovide objective information; if this lack of information is detrimental to public well-being, public policy makers can intervene to provide such information through information campaigns and other means. In the case of incidental physical activity, it would be fair to conclude that the market does currently underprovide information, because this increasing cause of sedentarism has gone almost completely unnoticed except among an elite corps of physical activity researchers. Should we wish to make the case that a market failure has indeed occurred, however, simply providing more information is unlikely to rectify the problem. Cawley trenchantly suggests that an effort must be made to determine how to present information about physical activity so that people can more easily act on it.[79]

Policies. As the obesity epidemic has escalated in recent years, efforts to understand its causes and potential solutions have included considerable examination of the role of public policy.[80,81] Local zoning ordinances and other policies that contribute to urban sprawl, reduce access to safe walking and biking routes, and undermine ease of access to mass transportation, for example, have attracted considerable attention as environmental-level impediments to physical activity.[82,83]

The news media play a number of important roles in determining how community policies are shaped.[84] Agenda setting and framing, as described above, are two of these roles. The Robert Wood Johnson Foundation's Active Living By Design program is engaged in identifying and promoting policies that reduce environmental-level impediments to physical activity.[85,86] Media and marketing campaigns can and should be used to advocate for such policies at the national, state, and local level.[87]

RESEARCH QUESTIONS AND CONCLUSION

As is often the case, this review has raised more questions than it answered. Some of these questions—in the form of a proposed research agenda—are presented in Table 3. Heeding the urgings of Robinson and Sirard, I've focused this list on the questions that appear to have the greatest potential to inform solutions.[88] Hopefully, answers that identify high-impact public health strategies will be forthcoming in the not too distant future.

Conversely, we would be unwise not to take action while we answer these questions; there are actions that can and should be taken without delay. First, aggressive efforts should be made to increase the adoption and implementation of proven approaches to physical activity promotion, those involving media and otherwise. These marketing efforts should target all of the sectors of society that touch people's lives (e.g., their schools, workplaces, neighborhood businesses, health care providers, and community-based organizations). Second, although the evidence that media use displaces physical activity from our lives is less than ironclad, there is more than enough evidence to justify actively promoting voluntary limits on media use, especially for children. This should probably include a strong suggestion to parents to avoid enriching the media environments in their children's bedrooms. Lastly, we must mobilize our community's resources more effectively to advocate for policies and physical projects that promote active living environments.[89]

The media is an alluring temptress; it has long been such, and will likely always be so. We must invest in better understanding the nature and impact of media's temptation as it pertains to physical activity. We will be wise, however, to focus those investments both to better understand the problem, and to better cultivate media's potential as part of the solution.

SO WHAT? Implications for Practitioners and Researchers

It is clear that there are two sides of the media environment and physical activity coin. Americans' ever-increasing consumption of media appears to be displacing time they would otherwise spend being more active, even if only slightly more active. Conversely, there are at least five possibilities—all of which are currently largely untapped—through which we may be able to influence the media environment to promote physical activity. To reverse the long, slow erosion of (nonexercise) physical activities from American life, it would be helpful for practitioners to focus their creative energies on exploring these possibilities, and for researchers to support practitioners by developing answers to the long list of important currently unanswered questions presented in this paper.

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