

# Why and How Should I Exercise?

## A Content Analysis of Popular Magazines

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**Objectives:** In this study, we investigated how exercise is portrayed in popular, non-fitness focused magazines targeting various audiences. **Methods:** Ten popular magazines were selected based on target audience (Teens, Young Adults, Family, Middle-Aged Adults, Older Adults). Ten digital articles from each magazine's health/fitness section were coded for the primary reason to exercise, the frequency, intensity, time, and type of exercise recommended, and whether their recommendations were evidence-based. Frequencies were calculated by target audience. **Results:** The primary reason for exercise differed by audience, with appearance and fitness emphasized by magazines targeting younger audiences, and mental health/quality of life emphasized in magazines targeting older adults. Over half of the articles described exercises that should be completed 2x-3x/week for <10 minutes. Articles frequently recommended circuit workouts that could be completed at moderate or self-selected intensity. Only 10% of articles cited peer-reviewed evidence. **Conclusions:** Results showed popular magazines often represent exercise as something that can be completed in a short time frame with meaningful benefits. However, an overemphasis on appearance in young adults is apparent, which could undermine intrinsic motivation and behavior. Improved communication between researchers and popular magazines is needed to promote sharing of credible, evidence-based exercise content with the public.

**Key words:** exercise; magazine; Internet; motivation

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There are numerous benefits to engaging in regular physical activity, including a reduced risk of developing many chronic diseases, weight management, improved mood and mental health status, and an overall increase in quality of life.<sup>1</sup> To achieve these benefits, the current physical activity guidelines for American adults recommend 150 minutes per week of moderate-intensity activity or 75 minutes per week of vigorous-intensity activity. In addition, adults should engage in strength training at least 2 days per week.<sup>2</sup> However, despite the overwhelming evidence of physical activity benefits, recent estimates suggest only about 21% of American adults currently meet the guidelines.<sup>1</sup> Inactivity is prevalent among all age groups, but physical activity tends to decline with age and may

vary across different life stages.<sup>3</sup> For example, significant reductions in physical activity have been observed as individuals transition to young adulthood and parenthood,<sup>4,5</sup> and older adults may have unique barriers and preferences due to limitations in physical function, health problems, and lack of physical activity knowledge and experience.<sup>6</sup> Although it is possible to accumulate physical activity across various domains (eg, work, household, transportation), promoting increases in leisure-time exercise is perhaps the most common approach to physical activity promotion.

Individuals' perceptions of exercise are likely to influence their uptake of the behavior. For example, if one expects exercise will lead to positive outcomes such as weight loss, improved health, and

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reduced stress, he or she is more likely to adopt the behavior, whereas negative outcome expectations such as taking time away from other valued activities, sweating/muscle soreness, and other deterrents can influence exercise participation.<sup>7</sup> Such perceptions are developed from exposure to a variety of information and experiences, including messages conveyed in the media.<sup>8</sup> An extensive body of research demonstrates that the framing of such messages impacts the way they are perceived by the audience. For instance, if exercise is portrayed as a grueling, time-consuming task, individuals may be less likely to engage in it than if it is portrayed as a pleasurable activity that can be integrated into one's daily life.<sup>9</sup> The pathways by which magazine content can potentially influence readers' exercise perceptions and behavior are illustrated in the conceptual model (Figure 1).

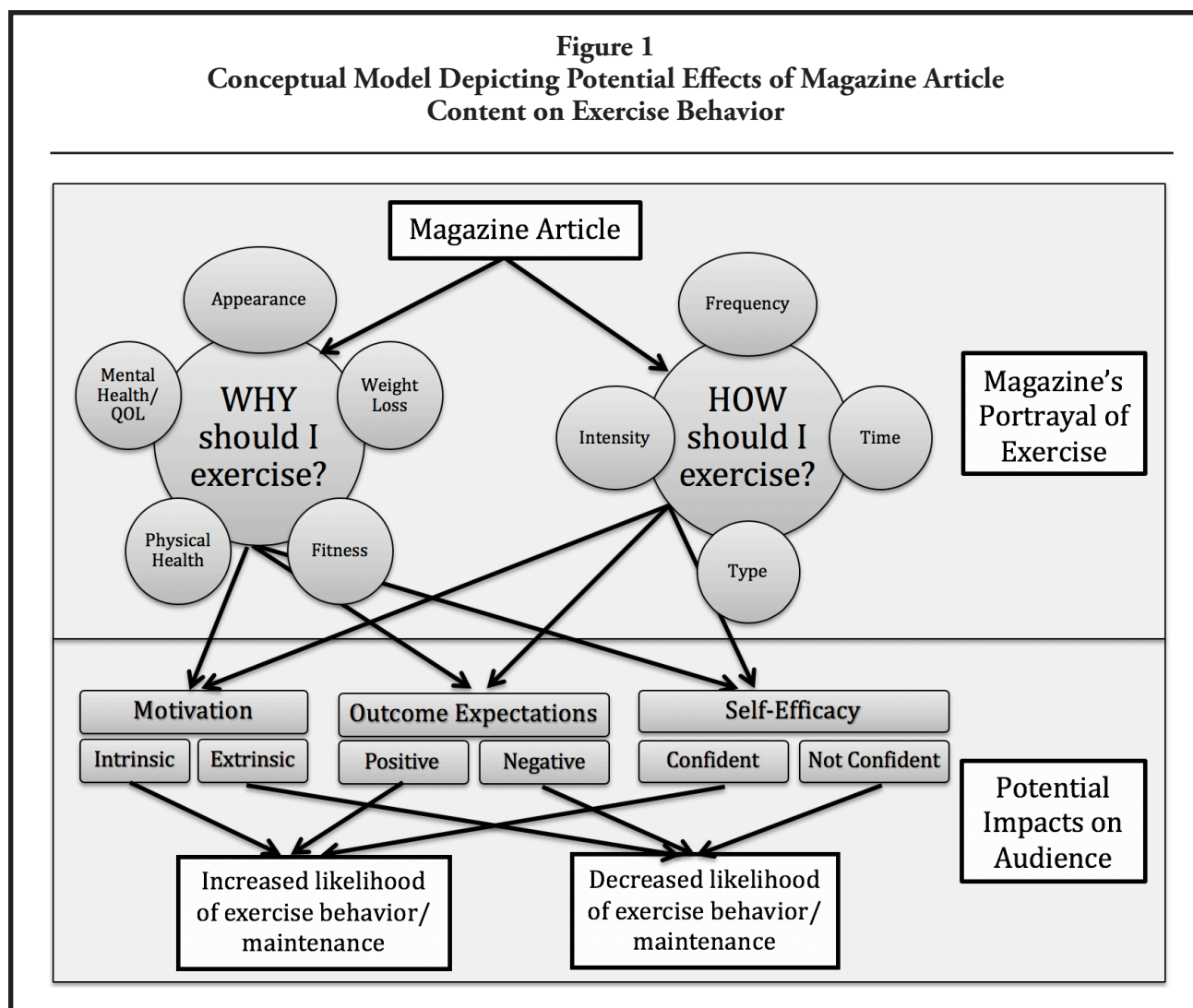
Previous content analyses have been conducted to examine magazine portrayals of exercise. Specifically, these analyses have investigated media frames, or the inherent messages disseminated by the magazines about *why* one should engage in a behavior.<sup>10</sup> These studies have focused largely on the extent to which exercise is framed as a tool for improving appearance versus health in health-focused magazines. For example, Aubrey's 'Looking Good vs Feeling Good' found that appearance and health frames are equally prevalent in health/fitness magazines including *Shape* and *Self*, which suggests these magazines may be giving contradictory messages to their readers by encouraging women to be healthy, but not to let health impede on the commitment to look good.<sup>11</sup> Willis and Knobloch-Westerwick conducted a similar study of women's health/fitness magazines, and found that editorial content emphasized appearance over health.<sup>12</sup> Bazzini et al<sup>13</sup> compared *Men's Health* magazine to *Women's Health*, and found that weight and appearance frames were equally prominent in magazines targeting both men and women. Even yoga, a type of exercise with a traditional focus on a mind-body connection and emotional well-being, has fallen victim to increasing focus on appearance and body objectification, as evidenced by a content analysis of mainstream yoga magazines.<sup>14</sup>

These findings suggest the dominant messages in health-focused magazines may be at odds with research about optimal reasons/goals for engaging

in exercise. Mounting evidence suggests messages that facilitate the development of intrinsic exercise goals (eg, exercising for the inherent satisfaction or enjoyment it provides) may have a more positive influence on exercise motivation and behavior than those that promote extrinsic reasons for exercise such as appearance or weight loss.<sup>15,16</sup> The heavy focus on appearance identified by previous studies is worrisome because of its link to increased body shame,<sup>11</sup> but also because such extrinsic goals have been associated consistently with poor exercise adherence over time.<sup>15</sup> Some research has suggested exercise goals related to daily well-being may be the most potent of all, because short-term affective outcomes are immediately noticeable and add value and meaning to engaging in exercise.<sup>17</sup> However, previous content analyses have not examined the extent to which popular magazines are emphasizing affective outcomes such as improved mood, energy, and stress as opposed to extrinsic reasons such as health, fitness, appearance, or weight.

We designed the present study to extend previous research on magazine representations of exercise in several ways. First, most previous studies have limited their investigations to health-focused magazines (ie, *Men's Health* and *Women's Health*) and not examined messages in other popular magazines. To fill this gap, we used magazines that had a primary focus on something besides fitness/health but still offered information to readers on the topic of physical activity/exercise. Readers of these magazines typically have broader interests and may not have the exercise knowledge or motivation that readers of health-focused magazines possess.<sup>18</sup> Thus, they may be using the magazine content as a primary source of information about why and how they should exercise. Ensuring that the information presented in these magazines is accurate, realistic, and framed positively may take on added importance for influencing readers' perceptions of exercise, and ultimately whether or not they engage in the behavior. Additionally, given the prevalence of online health information seeking,<sup>19</sup> this study analyzed digital (online) articles instead of print articles. Many magazines have adapted to the digital age by increasing their online presence to keep readers engaged, while also making much of their content available without a subscription to attract a diverse readership.

**Figure 1**  
**Conceptual Model Depicting Potential Effects of Magazine Article**  
**Content on Exercise Behavior**



This study also expanded the content analysis beyond media frames to include a focus on how exercise is portrayed in terms of the FITT principles (ie, frequency, intensity, time, and type). These characteristics may affect individuals' perceptions of exercise, and thus, the likelihood that they will engage in the behavior; yet, to our knowledge, no studies have quantified representations of these variables in magazines. Finally, although previous studies have compared magazine content targeting women versus men, we are not aware of any studies that have compared content across target audiences of various ages. The relevance of various reasons for exercise, as well as the type and intensity of preferred exercise, may vary across the lifespan.<sup>6,7,20</sup> Thus, we used information about the magazines' target audience demographics to stratify our results.

The overall purpose of this study was to conduct a content analysis to compare: (1) the primary reason to exercise, and (2) the frequency, intensity, time, and type of exercise portrayed in popular digital magazines with designated health/fitness sections across target audiences of various ages. In addition, we evaluated whether magazines cited scientific evidence to support their recommendations. As the Internet has become a primary means of seeking exercise and health information, it is critical to examine the messages about why and how one should exercise being delivered through popular online sources. For practitioners working to promote exercise among various groups, understanding the normative messages to which their clients or patients are exposed can inform their interactions with them, and allow them to intervene if

**Table 1**  
**Characteristics of Included Magazines**

Title	Target audience	Circulation	% female	Magazine's target demographic
<b>Seventeen</b>	Teen	2,000,585	85.4%	Girls/women 12-24
<b>Teen Vogue</b>	Teen	1,007,108	94.8%	Teenage girls
<b>Cosmopolitan</b>	Young adult	3,011,848	82.3%	Women 18-35
<b>Glamour</b>	Young adult	2,297,755	90.5%	Women 18-49
<b>Family Circle</b>	Family	4,056,156	90.5%	Mothers
<b>All You</b>	Family	4,300,000	96.7%	Mothers
<b>Woman's Day</b>	Middle-aged adult	3,275,962	94.6%	Women 35-60
<b>Prevention</b>	Middle-aged adult	1,512,798	78.7%	Women 30-65
<b>AARP The Magazine</b>	Older adult	23,144,225	58.0%	Adults 50+
<b>Reader's Digest</b>	Older adult	3,024,031	59.0%	Emphasis on adults 50+

**Note.**  
Information compiled from magazine websites and media kits

they are aware that messages may be undermining individuals' exercise behavior and/or well-being. This research also may encourage health behavior researchers to collaborate more intentionally with popular magazines and/or other media sources to ensure current exercise research is being communicated to lay audiences in a format that is accurate, understandable, appealing, and highly accessible.

**METHODS**

**Magazine Selection/Inclusion Criteria**

To focus the investigation on popular magazines, we started with a list of the top 100 magazines in circulation in North America from 2015.<sup>21</sup> Next, members of the research team screened the top 100 magazines to determine if they met the following inclusion criteria: (1) primary focus was not related to health and/or exercise/fitness, (2) magazine had an online component, and (3) magazine had a designated health/fitness section online that included information related to physical activity/exercise. After screening each magazine, 26 of the 100 met these criteria. During the screening process, information regarding the magazine's target audience (age and sex) also was extracted from the magazine's website and/or media kit.

Because we aimed to examine the messages being sent to different audiences, 5 general target audiences were selected: (1) Teens, (2) Young Adults,

(3) Family, (4) Middle-Aged Adults, and (5) Older Adults. Next, to represent multiple sources per target audience but keep the analysis focused on high-circulation publications, the 2 most popular magazines (based on circulation data) that met all inclusion criteria were selected for each group. The following magazines were used for each target audience: (1) Teens: *Seventeen* and *Teen Vogue*, (2) Young Adults: *Cosmopolitan* and *Glamour*, (3) Family: *Family Circle* and *All You*, (4) Middle-Aged Adults: *Woman's Day* and *Prevention*, and (5) Older Adults: *AARP The Magazine* and *Reader's Digest* (Table 1).

Once the magazines were identified, to achieve a representative sample of their content, we chose 10 articles that focused on exercise or physical activity from each magazine's website within the designated health/fitness section. The 10 most recent exercise/physical activity articles that were accessible on the websites were used for each magazine, resulting in 100 articles included in the content analysis. All articles were gathered during the week of November 1, 2016.

**Coding**

A total of 6 investigators coded the articles. To establish the coding procedure, an initial set of variables and categories were developed by the lead investigator based on a preliminary review of the



**Table 2**  
**Final Categories for Each of the 6 Variables Extracted and Coded**

	Reason for Exercise	Exercise Frequency	Exercise Intensity	Exercise Time (Duration)	Exercise Type	Evidence-based
1	Appearance	2-3 days/week	Light	<10 minutes/ <10 exercises	Cardio	Peer-reviewed article
2	Weight loss	4-5 days/week	Moderate	11-30 minutes/ 11-20 exercises	Strength	Fitness professional/ expert advice
3	Fitness/stamina	6-7 days/week	Vigorous	>30 minutes/ >20 exercises	Flexibility	None
4	Physical health		Self-selected		Circuit	
5	Mental health/QOL <sup>a</sup>				Other	

Note.

a: QOL=Quality of life

reasons and FITT principles commonly portrayed in popular magazines. Subsequently, 5 articles from 5 magazines were randomly selected and coded by all investigators. This allowed the group to address and resolve ambiguities, and resulted in a number of revisions to the initial categories. Additional practice coding was completed to test these refined guidelines. All articles for the final analysis were coded by 2 investigators. Once the coding was completed individually, the partners met to discuss their results and resolve any potential discrepancies. Initial inter-rater agreement was 79.33%; any discrepancies between partners were brought to the full group and discussed until 100% agreement was reached.

During coding, information on the following variables was extracted: reason for exercise, exercise frequency, intensity, time, and type, and whether the article was evidence-based. Table 2 displays the final categories used, which are described in detail below.

**Reason for exercise.** Reason to exercise was often found in the title and/or introduction to the article (eg, “Six bodyweight exercises to sculpt a lean body” [appearance] or “The most important workout to do for your overall health” [physical health]). Final categories included appearance, physical health, weight loss, fitness/stamina, and mental health/quality of life (including affective benefits such as stress relief, improved mood, and vitality). Most articles focused on one central reason, but some contained a combination of messages. Thus,

for the articles that included 2 reasons, both reasons were coded.

**Exercise frequency.** For frequency, information about the recommended number of days per week of exercise was extracted. The following categories were created based on the distribution of observations: 2-3 days/week, 4-5 days/week, and 6-7 days/week. If an article included a range that straddled 2 categories (eg, 3-4 days/week), it was included in the lower category, based on the assumption that readers would view that amount as the minimum recommended frequency to achieve the cited benefits. However, if a greater proportion of the range fell in the upper category, it was included in that group (eg, 3-5 days/week was classified as 4 – 5 days/week).

**Exercise intensity.** Categories for exercise intensity included light, moderate, vigorous, and self-selected. During initial coding, few articles explicitly referenced an intensity. Thus, using average MET values from the Compendium of Physical Activities,<sup>22</sup> guidelines were established regarding what constituted light versus moderate versus vigorous activity. Light activity included low-intensity activities such as yoga and stretching, whereas moderate activity consisted of bodyweight strength training (eg, ab workouts) and walking. Vigorous activity included high-intensity activities such as running, as well as boot-camp style workouts and any articles that contained keywords like ‘challenging’, ‘hard-core’, or ‘brutal’. Because a large number of articles presented circuit-style workouts that in-

cluded a series of exercises that could vary significantly in intensity based on readers' level of fitness and/or the amount of effort they applied towards the workout, a fourth 'self-selected' category was included to account for these variations.

**Exercise time (duration).** For duration, information about the number of minutes *or* the number of exercises (ie, for strength or circuit-type workouts recommending X sets of X unique exercises) mentioned in the article was extracted. The total number of exercises was determined by multiplying the number of exercises by the number of recommended sets. In cases where articles cited a range of minutes (eg, 10-15 minutes) or sets (eg, 2-3 sets), the lower number was used, as described for exercise frequency above. Based on the estimate that one exercise would take approximately one minute to complete, and longer workouts would include additional rest time between exercises and/or sets, the following guidelines were used to equate number of exercises to minutes: <10 exercises ≤10 minutes, 10-20 exercises=10-30 minutes, and >20 exercises ≥30 minutes.

**Exercise type.** For type of workout, categories included cardio, strength, flexibility, circuit, and other (eg, sport-related activities, activities of daily living). Articles describing circuit workouts presented a series of specific exercises to be completed and typically contained more than one mode of exercise (eg, cardio + strength).

**Evidence-based.** References to sources to support the recommendations provided in the articles were examined. Initially this investigation was limited to whether the articles cited a scientific (peer-reviewed) source of evidence, but during initial coding many articles did not cite peer-reviewed research, but did reference a personal trainer or other "expert". Therefore, an additional category 'Fitness Professional' was created. Any articles that did not reference a fitness professional or peer-reviewed article were coded as having no evidence.

## Data Analysis

After coding was complete, the numbers of responses for each category were summed by target audience and frequency distributions were examined for each variable. Subsequently, chi-square analyses were conducted to determine whether the distributions varied by target audience.

## RESULTS

### Frequency Distributions

**Reason for exercise.** A total of 120 reasons for exercise were identified. Across all target audiences, the most prominent reason for exercise was fitness (38.3%), followed by appearance (30.8%). Only 5.8% of articles specifically mentioned weight loss as a reason for exercise, whereas 10% and 15% emphasized physical health and mental health/quality of life, respectively.

**Exercise frequency.** Approximately half of the articles (49%) made some reference to exercise frequency. Of these, 51.0% referred to exercising 2-3 days/week, 16.3% referred to exercising 4-5 days/week, and 32.7% referred to exercising 6-7 days/week.

**Exercise intensity.** An equal number of articles recommended moderate exercise (33.1%) or exercise at self-selected intensity (33.1%) exercise, whereas vigorous (23.8%) and light (10.0%) intensity exercise were mentioned less frequently.

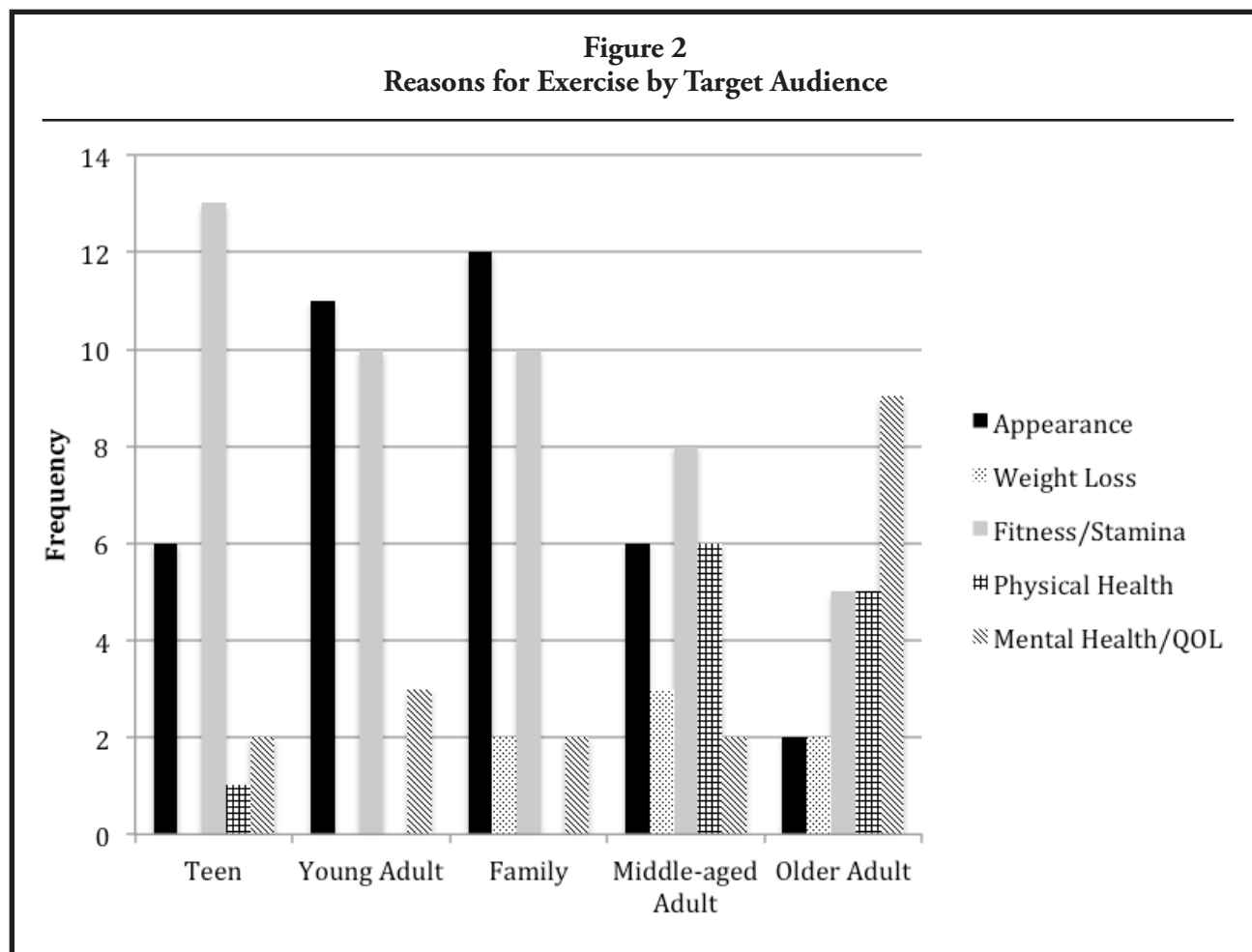
**Exercise time (duration).** A total of 73 articles specified duration in terms of either minutes or number of exercises. Of these, 50.7% described exercises less than 10 minutes in duration, 31.5% referenced exercises 11-30 minutes in duration, and 17.8% discussed exercise greater than 30 minutes in duration.

**Exercise type.** Circuit workouts were the most prevalent type of exercise referenced (43.9%), followed by strength (24.6%) and cardio (14.9%) workouts.

**Evidence-based.** Of the 100 articles examined, only 10 cited a peer-reviewed article, 6 of which were in magazines targeting older adults (3 in *AARP* and 3 in *Reader's Digest*). However, 60% of articles referenced some sort of "expert" (eg, certified personal trainer, fitness pro, etc). Thirty articles (30%) did not cite either a scientific article or an expert to support their recommendations.

### Differences by Target Audience

Chi-square analyses revealed no significant differences by target audience in terms of the frequency ( $\chi^2 = 8.22, p = .41$ ) or time ( $\chi^2 = 2.40, p = .97$ ) of exercise recommended (Figure 3a and 3c). However, there were statistically significant differences across target audiences for reason for exercise ( $\chi^2$



= 42.11,  $p < .001$ ), exercise type ( $\chi^2 = 33.31$ ,  $p = .007$ ), exercise intensity ( $\chi^2 = 32.48$ ,  $p = .001$ ), and evidence-base ( $\chi^2 = 21.16$ ,  $p = .007$ ).

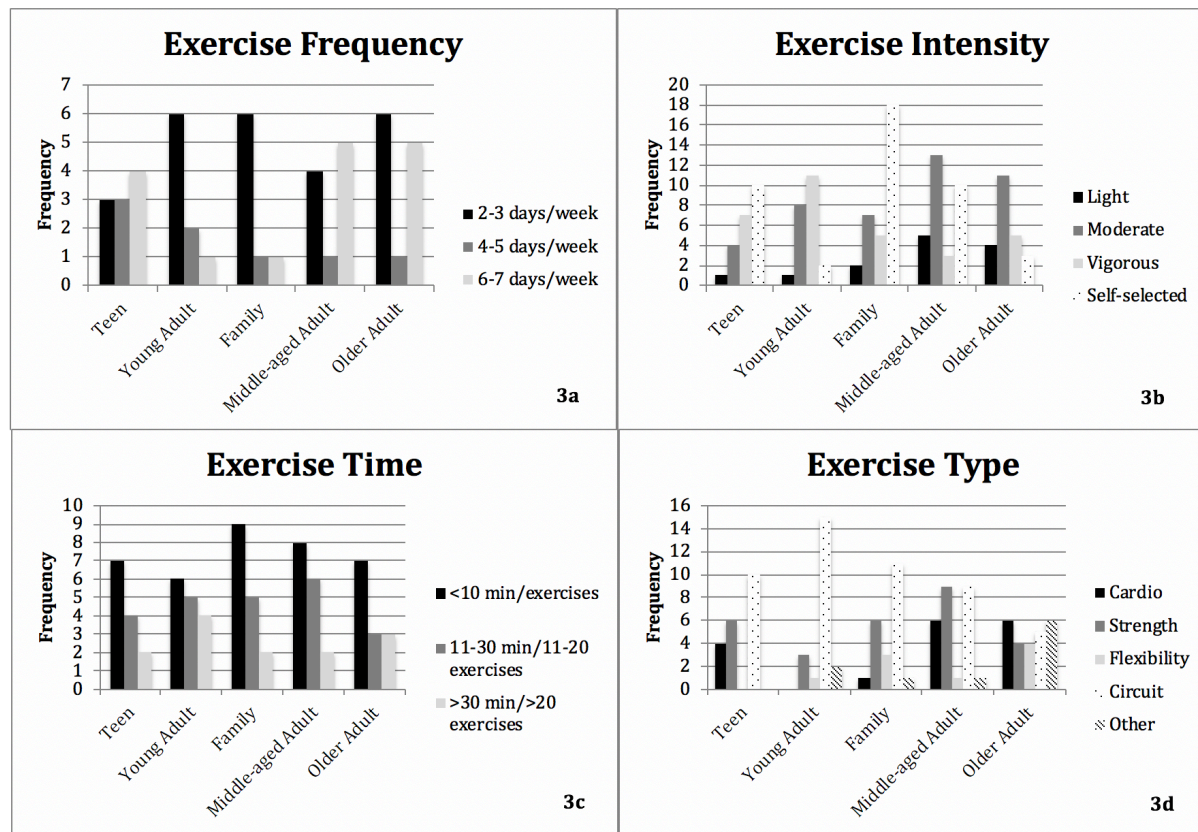
Specifically, appearance was the most common reason for exercise portrayed to the young adult and family audiences, whereas fitness was the most common for the teen and middle-aged adult audiences. With the exception of one reference to physical health in a teen magazine, physical health was only mentioned as a reason for exercise for the magazines targeting the 2 oldest target audiences, and weight loss was only mentioned in the magazines targeting the 3 oldest audiences. Mental health/quality of life was the most common reason for exercise cited in magazines targeting older adults (Figure 2).

For exercise type, circuit workouts were most common in the magazines targeting the 3 youngest target audiences, whereas cardio and flexibility exercises were referenced more often as the target

population's age increased. References to strength training peaked in the middle-aged adult audience (Figure 3d). Similarly, vigorous intensity exercise was more often mentioned in magazines targeting younger audiences, and references to light and moderate intensity exercise increased as the age of the target audience increased. Recommendations to do exercise of self-selected intensity were common in the teen, middle-aged adult, and especially family audiences (Figure 3b).

As mentioned previously, magazines targeting older adults were more likely to cite scientific articles than magazines targeting the other 4 target audiences. Magazines targeting teens, young adults, and families frequently mentioned fitness experts or professionals (72% of all articles for these audiences), whereas 55% of articles targeting middle-aged adults did not reference either a scientific article or an expert.

**Figure 3**  
**Frequency, Intensity, Time, and Type of Exercise by Target Audience**



**DISCUSSION**

The overall aim of this study was to examine how exercise is portrayed in popular online magazines that publish content related to exercise, but do not have a primary focus on health/fitness. Specifically, this investigation compared reasons for exercise, the recommended frequency, intensity, time and type of exercise, and the extent to which content was evidence-based across popular magazines targeting audiences of different ages. To our knowledge, no previous content analyses have examined popular, non-health-focused magazines specifically, nor included comparisons of magazines targeting readers in different life stages, and the analyses yielded several intriguing findings.

Our findings suggest that exercise-related messages may differ between magazines with a specific health focus compared to those that have a broader

focus. For example, this analysis found that fitness was the most commonly portrayed reason for exercise, whereas an analysis of women’s health magazines (eg, *Shape*, *Fitness*, *Women’s Health*) by Aubrey et al<sup>23</sup> found health and appearance frames were significantly more common than body competence (ie, fitness) frames. However, the messages in the present study varied based on the target audience. Magazines targeting young adults and parents, who are likely the target audience of the health and fitness magazines examined in previous studies, focused on exercising to improve appearance, whereas magazines targeting older adults primarily emphasized benefits related to mental health and quality of life. Although it is encouraging that magazines targeting teens put less emphasis on appearance and weight, appearance messages peaked in magazines targeting young adult and family audiences, which is concerning for several reasons. First, media expo-



sure to images of ideal bodies has been associated with reduced body satisfaction and increased body shame,<sup>11,24</sup> which may be precursors to deleterious behaviors such as disordered eating and exercise addiction.<sup>25</sup> Second, focusing on appearance may promote extrinsic motivation and undermine exercise maintenance, particularly among parents. Parents view their children and families as their top priority, and choose to prioritize daily activities that contribute to this role in meaningful, noticeable ways.<sup>26</sup> Presumably, if the exercise messages they encounter primarily focus on appearance, these messages are disconnected from the core roles that they value and may exacerbate feelings of guilt about taking time to exercise.<sup>26</sup> Healthcare providers and public health practitioners who frequently interact with young and middle-aged adults should be mindful of these dominant appearance-focused messages and assess clients/patients' prominent reasons for exercise. If a focus on extrinsic motives is apparent, practitioners can employ intervention strategies (eg, motivational interviewing) to alter individuals' exercise perceptions and shift their focus to intrinsic benefits that are less likely to be promoted in the popular media, but more closely tied to outcomes they value.

Accumulating evidence suggests exercising to achieve intrinsic benefits related to daily quality of life contributes to exercise engagement and maintenance.<sup>16,17</sup> Thus, it is perhaps not coincidental that magazines targeting older adults were most likely to focus on these benefits, and also most likely to cite peer-reviewed evidence in their articles. There are other potential explanations for this shift in article focus based on the target audience. Physical and mental health outcomes are likely to become increasingly relevant as individuals age, whereas appearance becomes less important.<sup>27</sup> Thus, magazines targeting older readers seem to be matching their content to the needs and values of the target audience. It is also worth noting that the readership of the 2 magazines targeting older adults was more evenly distributed between men and women, whereas the others primarily targeted women. Thus, the sex of the target audience may have played a role in the differences in content. An emphasis on appearance and body ideals has been viewed primarily as a women's issue,<sup>24</sup> though one content analysis found body objectifying messages to be equally prominent in health magazines tar-

geting men and women.<sup>13</sup> Further research is needed to understand how age and sex might interact when developing optimal exercise messages.

Our results also shed light on the ways exercise is portrayed in terms of frequency, intensity, time, and type. Overall, results showed popular magazines are often representing exercise as something that can be completed in a short time frame with meaningful benefits. For example, over half of articles described exercises that would last 10 minutes or less, and should be completed 2-3 times per week. Additionally, a large proportion of articles recommended circuit workouts that could be completed at a moderate or self-selected intensity. In many cases, the exercises depicted in these articles would be feasible in a home setting with little or no equipment. Considering lack of time is a commonly cited exercise barrier,<sup>26,28</sup> it appears that popular magazines are succeeding in portraying exercise as something that is feasible to fit into one's busy daily life. Furthermore, there is evidence that vigorous intensity exercise is often perceived to be unpleasant, particularly among overweight and/or inactive individuals,<sup>29</sup> so it is encouraging that magazines are emphasizing moderate intensity activity, particularly when targeting audiences over 30 years old. Overall, popular magazines appear to be "selling" the idea that exercise is easy to do, which could enhance readers' confidence (ie, self-efficacy) in their ability to engage in the behavior.

There are several potential concerns regarding popular magazines' representations of exercise, however. First, such brief, infrequent bouts of activity would not meet the current national physical activity guidelines. Some emerging evidence suggests brief bouts of activity may contribute to short-term physiological benefits,<sup>30</sup> but further research is needed to identify the health benefits of bouts of activity less than 10 minutes in duration. Second, magazines may be promoting unrealistic outcome expectations by promising dramatic changes in fitness or appearance with minimal effort. Although positive outcome expectations may prompt individuals to initiate exercise, exercise maintenance relies more heavily on one's satisfaction with actual outcomes.<sup>7,31</sup> Thus, if the espoused improvements in fitness or appearance do not occur in a short time frame, individuals may become discouraged and discontinue the exercise.<sup>32</sup> Despite these con-

cerns, the current guidelines state that “some activity is better than none,” and dose-response studies have demonstrated the largest health benefits are obtained when individuals move from doing no activity to doing some activity, even if they fall short of the recommended 150 minutes per week.<sup>33</sup> Thus, for individuals who are doing no activity and/or do not believe carving out 30 minutes per day for exercise is a realistic goal, popular magazines may be providing an avenue for them to incorporate some exercise into their lives. It is worth noting that almost all articles focused on leisure-time exercise (or “workouts”), and in doing so may constrain readers’ views of what “counts” as physical activity. Healthcare professionals should consider this bias when interacting with clients/patients, and provide recommendations for accumulating physical activity as part of other daily activities, including occupational and household duties.<sup>34</sup>

The fact that so few articles cited peer-reviewed evidence is concerning, and reinforces the finding that many of the messages about exercise in popular magazines are in conflict with current evidence about optimal physical activity goals and recommendations. Although many articles did cite an “expert” to support their recommendations, it is difficult to determine the credibility of these individuals. Furthermore, we did not evaluate the quality of the peer-reviewed studies cited, as previous studies of quality of health-related evidence have done.<sup>35</sup> Nevertheless, our findings are consistent with a content analysis of popular Australian magazines that found the health advice provided was generally poorly presented and unreliable.<sup>36</sup> Wilson et al<sup>36</sup> caution that the standards for rigor in magazines tend to be lower than the standards for news media, yet magazines still portray their content as “evidence-based and current.” In many cases the content that draws readers’ attention (eg, quick fixes that improve appearance with minimal time and effort) may conflict with scientific evidence regarding successful behavior adoption and maintenance. Thus, consumers should be advised to be cautious of media messages and look for signs that the information provided is evidence-based and reliable (eg, it references peer-reviewed research or was produced by a reputable, non-commercial organization). In particular, given the proliferation of online health information seeking, ongoing promotion of eHealth literacy is warranted.<sup>37</sup> At the

same time, magazines still can present evidence-based information in an appealing way. Indeed, previous research has shown individuals are more receptive to information from a credible source.<sup>38</sup> To facilitate the presentation of evidence-based information in popular media, researchers should work to communicate their findings in a way that is understandable to lay audiences, and explore strategies for increasing the accessibility of their research to journalists (eg, via social media).<sup>39</sup>

This study has a number of strengths and limitations to acknowledge. Its major strength is that it addresses several questions that have not been addressed previously by content analyses. The examination of differences based on age of the target audience, the FITT principles, and online non-health magazines are all unique contributions to the existing literature. By using online articles from popular magazines that are freely accessible, the analysis was aligned with a prominent means of accessing exercise information.<sup>19</sup> Although magazine popularity was determined by circulation, data regarding online readership was available in some media kits, and all indicated that their websites had millions of unique visitors per month, thereby suggesting that their online content was highly accessed as well. The coding procedures were developed iteratively, building on previous research but adapting as necessary to address the key research questions. One key limitation was that almost all magazines included in this content analysis catered to largely female audiences. Thus, it is not possible to draw conclusions about how exercise is portrayed to men, or how these depictions may differ between men and women. Additionally, some of the age ranges of the target audiences overlapped, so these results should be approached with caution and investigated further. Furthermore, the magazines included may have had different editorial visions that impacted the content as much or more so than the target audience. Finally, this study only examined the content delivered by magazines, but not how it was perceived by readers. Future studies should examine how varying representations of exercise influence individuals’ attitudes, motivation, and behavior across the lifespan.

In conclusion, this study enhanced our understanding of the messages about why and how one should exercise to which individuals in various life

stages are exposed through popular magazines. Our results suggest that with the exception of magazines targeting older adults, most popular magazines are framing exercise as a means to achieve extrinsic benefits related to fitness and appearance as opposed to intrinsic benefits related to enhanced mental health and quality of life. Additionally, many magazines portray exercise as something that is feasible to fit into daily life by featuring workouts that are short in duration and moderate in intensity. Although this may enhance readers' confidence to incorporate exercise into their lives, it also may contribute to unrealistic expectations about the outcomes exercise will produce. Further research is needed to investigate the extent to which magazines' messages influence readers' exercise perceptions and behavior. However, it is important that public health practitioners and healthcare providers are aware of the current messages, and their potential effects on their audiences, to be more effective in counseling their clients to facilitate more positive, realistic perceptions of exercise. Our results also suggest popular magazines should strive to incorporate more peer-reviewed evidence to support their exercise recommendations. Researchers can facilitate this process by translating their results for lay audiences and highlighting practical recommendations based on their findings.

### Human Subjects Statement

This research did not involve human subjects.

### Conflict of Interest Statement

All authors of this article declare that they have no conflicts of interest.

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